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SPRUE.

VAN STEENIS (P. B.). Tropische spruw. [**Tropical Sprue.**]—*Nederl. Tijdschr. v. Geneesk.* 1931. Apr. 18. 75th Year. No. 16. pp. 2113–2134. [34 refs.]

In this study, based on 18 cases, the symptomatology is well reviewed and a discussion on the pathogenesis and therapy of the disease is also included. Some of the points made are especially interesting. By means of the duodenal sound it is found that the pyloric sphincter is not strongly contracted, so that it is possible for the duodenal contents to pass back into the stomach and give rise to disturbance of gastric function. The character of the faeces is one of the most pathognomonic signs of sprue. With a diet which gives a not too frequent pulpy stool, meat and starch digestion is found to be adequate. The digestion of fat, however, is always disturbed : the stool shows much fatty acid and soaps with some neutral fat. If there is much diarrhoea the neutral fat is more abundant. A sprue stool is described in more or less identical terms by all authors as a large pasty, clayey, rising mass, full of gas bubbles, acid and usually very malodorous. The gas bubbles are in fact soap bubbles ; on passage of the faeces the lighter constituents, the fat, fatty acids, soaps and air bubbles come to form a layer on the surface and this is the cause of the " rising " stool. The colour of the stool is due to fat and not, as has been maintained, to a replacement of the usual hydrobilirubin by leuco-urobilin. The chief disturbance of function takes place in the small intestine and two main theories of its etiology hold the field : (1) that of a causative organism and (2) that of a chemical fermentative process in the duodenum. It is this second possibility which has been much studied and especially its relation to pancreatic, hepatic and duodenal function. The older idea of pancreatic insufficiency as a cause has, however, been largely abandoned. In sprue bile is excreted in smaller quantity than normally and this applies to the bilirubin, the bile acids and cholesterin but most of all to bile acids. The very significant diminution of the bile salts in the bile and the fact that no accumulation in the blood and no excretion in the urine takes place make it possible that there is lessened formation of these salts. Support for this view is to be found in the examination of patients with bacillary dysentery where there may be almost complete cessation of the excretion of bile, sometimes for days, without increase

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in the content of bilirubin in the blood or of urobilin in the urine. On other grounds than these also, a connexion between sprue and bacillary dysentery may be entertained. The explanation of the intestinal symptoms in sprue as due to a deficiency of the bile salts is in accordance with the fact that administration of these salts therapeutically causes their disappearance much more quickly and completely than dietetic methods alone.

Another prominent symptom of sprue is anaemia. It is however a variable symptom ; it may develop early and acutely, or slowly and gradually, or sometimes suddenly after a number of years. Again, there are cases of long standing sprue where the anaemia is slight. The resemblance of sprue anaemia to pernicious anaemia is well recognized but the two are regarded as of different type by the author, the first as being much more an aplastic and to a less extent haemolytic anaemia and the second as the reverse.

Under the head of etiology reference is made to *Monilia psilosis* as the causative organism, but this view is rejected. The author seems more inclined to favour an etiological connexion between bacillary dysentery and sprue. The article concludes with some observations on treatment and especially by bile salts. This treatment apparently is not at all new, for it was favourably mentioned in a treatise by Bosch who wrote of Indian sprue in Amsterdam in 1837. Reference is also made to its use in recent times by Liston and the method is evidently regarded favourably by van Steenis himself, who sums up his treatment of sprue in general terms as diet, sodium taurocholate 40 mgm. five times daily, sometimes calcium preparations with parathyreoid gland, liver for the anaemia, sometimes arsenic and, on occasion, blood transfusion.

W. F. Harvey.

Tyner (James D.). **Tropical Sprue : its Differentiation from Pernicious Anaemia by the Morphology of the Neutrophilic Leukocyte.**— *Clifton Med. Bull.* 1931. Apr. Vol. 17. No. 2. pp. 86–87. [3 refs.]

In a previous paper (*ante*, p. 660) the author differentiated sprue from pernicious anaemia by the Arneth count ; the present paper is a development of this or, more strictly speaking, another mode of expressing the same thing. In neither case is it a means of diagnosing sprue, since in this disease the Arneth count is to all intents and purposes normal, viz., an index of 62·1 in 17 out of 20 cases of tropical sprue whereas it was 61·1 for ten normal subjects ; the index in 10 cases of pernicious anaemia was 32·45.

As regards the neutrophile leucocytes in sprue, as the Arneth index shows, they are mainly of the 2–3–4 segment type, whereas in pernicious anaemia those of 5–6–7 segments are frequently encountered. The leucocytes in the latter are of larger size than normal and the nuclear segments have delicate stranding and little vacuolation. In sprue, besides the fewer and larger nuclear segments, the connecting strands are coarser and the segments themselves vacuolated. This condition is seen in any mildly toxic condition. Hence, as stated above, though useless as a diagnostic feature of sprue, the leucocyte characters are serviceable in differentiating sprue from pernicious anaemia.

H. H. S.

RAMANUJAYYA (R.). **The Incidence of Sprue amongst Indians.**—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. pp. 552–553.

The author affirms that sprue is common among Indians in the district under his care in Southern India, and that typical signs present are flatulent diarrhoea and glazed tongue with superficial erosions and anaemia. He states that he " has seen many persons suffering from typical sprue," but the five of whom he gives details are not altogether typical ; thus the stools in one were copious and watery, in another green in colour, a third was constipated ; three had general abdominal tenderness, one " a burning sensation all over the body." He thinks that water supply, climate and poverty are of great aetiological importance, but adduces no evidence for this. No history of preceding dysentery, either amoebic or bacillary, was obtained. Some got well on alkalies and astringents, some on acid, others recovered spontaneously ; there were no fatal cases. [Evidence is accumulating that Indians do suffer from sprue, but the statements in this paper are of too general a character to have much weight either pro or con.]

H. H. S.

MALCOMSON (G. E.) & MURTHY (K. N.). **The Frequency of Sprue among Indians in Madras.**—*Indian Med. Gaz.* 1931. Apr. Vol. 66. No. 4. pp. 192–193.

The authors state that in their experience sprue is " an extremely common disease among Indians, at any rate among Madrasis." Most of the cases are among the well-to-do, and between 20 and 54 years of age ; they saw none in children or the aged. Many gave a history of preceding dysentery, amoebic or bacillary. The symptoms detailed were morning diarhoea, and anaemia of the pernicious type in 4 cases, while test meals showed hypochlorhydria and a van den Bergh test gave an indirect positive of ½ to 2 units. Haemolytic streptococci were isolated from stools and urine of some of the patients [number not stated] and in four cases *Cl. welchii* from the stools, and the authors believe that one or both of these are accountable for the anaemia. [Details are not given as regards stomatitis, wasting, or physical examinations of any of the patients.]

H. H. S.

ASHFORD (B. K.). **The Relation of Monilia psilosis to Tropical Sprue and an Evaluation of Fermentation of Sugar as a Criterion for Specificity.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. Mar. Vol. 6. No. 3. pp. 310–333. [School of Trop. Med., Univ. of Porto Rico, San Juan.]

It is with sincere regret that the reviewer finds himself unable adequately to summarize this article, for though it deals with no cases more recent than 1917, Professor Ashford's work calls for notice even when he is busy pursuing the wraith of Monilia psilosis.

In the present instance, however, the difficulty arises from the practical impossibility of following some of the statements or of reconciling the letterpress with the tables, to which the former frequently refers. The author duly notes the changes which the so-called Monilia

psilosis may undergo and shows how marked the differences may be in morphology, fermentation reactions and pathogeny.

Table 1 gives succinct clinical notes of cases with "typical" M. psilosis and Table 2 the fermentation reactions in detail of each case, together with the gross appearance of the culture and the clinical diagnosis of the disease. There are several, however, mentioned in Table 1 which are not found in Table 2 and, as regards the latter, the author states: "Table II shows that there were 114 cases from which *Monilia psilosis* was isolated; 127 of these . . . . were cases of sprue." Again, "Table IV shows that of the sixty-one cases in which *Monilia psilosis* was found there were 22 cases of sprue . . . ." but Table 4 is headed cases negative for Monilia psilosis, while Table 3 (of which there are two) gives, it is true, a list of 22 cases, but only 20 of these were diagnosed as sprue. Later, Table V is referred to, but there is no Table V presented.

On fermentation changes only Dr. Ashford speaks of six types of monilia; in two instances he succeeded in making atypical strains typical by animal passage and infers that among the 61 cases in which monilia was found "some of these aberrant strains might have been degraded forms of *Monilia psilosis*" [a conclusion with which no one will quarrel]. He agrees with FAIRLEY and MACKIE that "in fifty per cent. of those cases not clinically sprue, a typical Monilia psilosis, or some nearly related atypical form thereof, has been found in the faeces," so we must look forward with patience to the time when some sort of proof is adduced, beyond mere clinical association, that Monilia psilosis has some aetiological connexion with sprue, and in the meantime experiment can be pursued without record in the literature until some definite results, positive or negative, can be reported.

It is gratifying to see that Dr. Ashford knocks another nail in the coffin of the oft-repeated but unwarranted deduction that "sprue is nothing but a form of dysentery" based merely on the fact that in some cases sprue is preceded by dysentery; indeed, he states, "the very diet employed to cure dysentery may provoke sprue." Far too many misprints have escaped the vigilance of the proof reader.

H. H. S.

EFREMOW (V.). Zur Frage der Pathogenität des Moniliapilzes und seiner Rolle im Spruesymptomenkomplex. [**The Pathogenicity of Monilia and their Rôle in Sprue.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Oct. Vol. 35. No. 10. pp. 592–606. [48 refs.] [Trop. Inst. of S.S.R. Armenia, Erivan.]

The author precedes the detailed account of his own researches by a brief description of the history of sprue and more minutely and with great fairness an epitome of the work of others on Monilia in connexion with this disease during the last 20 years or so. His own work has been carried out on 6 cases of sprue, one of pernicious anaemia and one of amoebic dysentery. From the faeces of 5 sprue patients he isolated 4 strains of the M. psilosis Ashford type and a similar organism from the case of dysentery. From the other two patients he isolated two strains not conforming to that type; he names these M. armeniensis. The method of isolation, characters of growth and fermentation reactions are stated, followed by an account of numerous animal experiments on rabbits, guineapigs and white rats.

Intravenous inoculation of large doses into rabbits caused rapid death with high temperature, dyspnoea and convulsions; smaller doses gave rise to fever and wasting, with necrosis, abscesses and granuloma-like formations in kidneys, liver and spleen. Subcutaneous injection in small doses into rats and guineapigs set up small local abscesses which burst and healed. Feeding rats for a month on a vitamin C deficient diet and cultures of the Monilia produced no positive result. The post mortem findings in those animals which died or were killed are described. The author concludes that " M. psilosis and M. armeniensis are not completely harmless commensal symbionts, but are capable under certain conditions of time and place (ad hoc et ex tempore) of setting up widespread changes in the tissues ", but that " Monilia psilosis Ashfordi does not appear to be the specific cause of sprue ", that " M. psilosis and the allied M. armeniensis proved virulent for experimental animals producing marked reaction in the reticulo-endothelial system in the form of infective granuloma ", and finally that Monilias which find conditions suitable for their growth and development " doubtless play a part in disturbing the nutritional balance."

H. H. S.

ENGEL (Arthur). **A Case of So-Called Sprue.**—*Acta Med. Scandinavica.* 1931. Vol. 75. No. 3–4. pp. 341–359. With 4 figs. (1 folding). [38 refs.] [1st Med. Clinic of Serafimerlasarettet, Stockholm.]

The author describes in great detail and discusses with care and restraint a case presenting a typical picture of sprue. He precedes this with an account of tropical sprue in which he considers the symptoms individually, giving due credit to the work of British investigators. This account embodies most of the recent researches, but when speaking of the blood changes and the differences between pernicious anaemia and that of sprue, he makes no mention of the Arneth index which is low (about 33) in the former, usually normal or thereabouts (60+) in the latter. He also states that the cause of the frothiness of the stools is not known, beyond the fact that this character is not due to carbohydrate fermentation or decomposition of proteins; that it may be due to " soap bubbles " from the splitting up of the fats is not referred to.

The case described is of great interest: The woman, a teacher, was born in 1888, a native of Sweden. At the age of 31 suffered with severe diarrhoea with mucous stools, 15–20 in 24 hours. She recovered from this attack, but 4 years later had for a fortnight " diarrhoea with stools of a rice-water appearance." During the next 3 years (1924–27) she travelled round the world, visiting parts where sprue is known to be endemic. In 1925 she had a return of the diarrhoea and in 1926, in New Zealand, had a sore tongue. In 1927, the diarrhoea was severe, with passing of blood, and she became anaemic and emaciated. When seen by the author in 1929 she was having 10–15 frothy motions daily, the red cells were below 3 million, Hb 74 per cent. During the next 15 months her general condition varied but on the whole tended to deteriorate and in October 1930, the red cells were 1,480,000 per cmm., Hb 47 per cent., the anaemia being of the megalocytic type; the faeces showed " a moderate amount of neutral fat and a large amount of fatty acid crystals " [the actual figures are not given nor the ratio]; her mouth and tongue were inflamed and painful, the serum Ca was low and symptoms of tetany were

present. In short, she presented all the classical indications of sprue. She improved somewhat on high protein diet with abundant supply of vitamins C and D.

The author concludes : " Whether the patient acquired the disease in known sprue areas cannot be determined. But there is no reason to dismiss the possibility of the disease having been contracted in Sweden." [Seeing, however, that until the second year of her travels the stools were not characteristic and there had been no mouth symptoms, the case cannot be regarded as one of non-tropical sprue. The early mucoid diarrhoea may have been dysenteric and have prepared the way for the supervention of sprue when the patient visited Central America or other well known sprue locality on her travels.]

H. H. S.

MARBLE (A.) & BAUER (W.). **Calcium and Phosphorus Metabolism in a Case of Nontropical Sprue with Associated Tetany.**—*Arch. Intern. Med.* 1931. Sept. Vol. 48. No. 3. pp. 515–532. With 4 figs. [33 refs.] [Massachusetts General Hosp., & Harvard Med. School, Boston.]

This article embodies the report of an interesting case of diarrhoea associated with tetany in which details are given of the blood changes and of the calcium and phosphorus metabolism, with a discussion of the conditions found. The red corpuscles were at one time reduced to nearly half (2,260,000 per cmm.), haemoglobin 50 per cent., and white corpuscles 17,300. The anaemia was not of the megalocytic type, the average size was 7·8 microns, and there were no erythroblasts. The serum calcium was low (6·7 mgm. per cent.) and the phosphorus 1·28 mgm. The faecal values were approximately those of the intake and indicative, therefore, of impeded intestinal absorption. Rise in the serum calcium and relief from the tetany followed administration of Collip's parathormone, nevertheless the authors maintain that the condition was not due to parathyroid deficiency or dysfunction on the following grounds : Parathyroid deficiency is characterized by " a low value for serum calcium, a high value for serum phosphorus, normal excretion of fecal calcium and phosphorus, decreased excretion of urinary calcium and phosphorus and normal density of bone. Cases of tetany such as the one reported are characterized by a low value for serum calcium, a low value for serum phosphorus, increased excretion of fecal calcium and phosphorus, decreased excretion of urinary calcium and phosphorus and decreased density of bone."

The diagnosis of sprue was based on " the history of recurring attacks of diarrhoea, sore tongue, anaemia, extreme cachexia and irritability together with the large, bulky, watery and foamy, light-coloured stools." The patient had always lived in the northern part of the United States.

[The question of non-tropical sprue is a vexed one and any evidence which can be brought to bear on the subject is welcome, but there is a growing tendency to regard patients with diarrhoea and sore mouth as suffering from sprue, ignoring other conditions in which these symptoms are associated. In the details of the clinical history recorded in this article are several which militate against the diagnosis, or, at least, symptoms neither characteristic of, nor usual in sprue. Thus, the patient had suffered for three years (following a *sudden* onset) from watery diarrhoea, up to 20 stools a day, with remissions few and incomplete. The exacerbations " were usually preceded by acute infections of the upper respiratory tract, chiefly ethmoiditis and maxiliary sinusitis." Soreness of the tongue occurred the last year (i.e., two years after the onset) " at the time of the acute exacerbations of

diarrhoea." Again, " the course of the disease was febrile, with cough, sputum and pleuritic pains in the right side of the chest. Roentgenograms of the chest suggested a marked degree of bronchiectasis at the base of each lung." In short, the sudden onset, the febrile course, the watery diarrhoea, the leucocytosis, the non-megalocytic type of anaemia, the condition of the sinuses and of the lungs are all in favour of a chronic septic condition as opposed to sprue.]

H. H. S.

Ashford (Bailey K.). **A Case of Hypoplastic Anemia, Pernicious Type, in the Course of Sprue, with Frequently Repeated Hematological Examinations.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. Sept. Vol. 7. No. 1. pp. 11–22. With 5 charts (4 on plates). [5 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

A typical case of sprue under the author's care. The main point of interest is the blood condition. At one time the erythrocytes were reported as " under a million," in June, 1930, they were 2,800,000 and in November, 1,920,000 per cmm. Professor Ashford made repeated examinations, red and white cell counts, haemoglobin readings and Price Jones curves daily. The average mean of 33 Price Jones curves gave 8·57 microns ; there was considerable anisocytosis evidenced by a double dispersion of 3·81 (the normal being 2·2 or thereabouts). No megaloblasts were present. A further interesting feature was the frequent or daily excursion of red cells and haemoglobin, possibly due to action of the spleen as shown by McNee. The patient had been given liver for the treatment of his anaemia but it appeared to increase the diarrhoea and to make him feel worse. The results of the blood examinations are plotted on a series of charts in which the figures are expressed as percentages and are not easy to interpret. The author postulates the question whether deficiency of liver hormone or of haemopoiesis is paramount in this type of anaemia, but data are not sufficient for a decision.

H. H. S.

Murthi (K. N.). **Results of Blood Examinations in Sprue.**—*Indian Med. Gaz.* 1931. Feb. Vol. 66. No. 2. pp. 78–82.

The author has examined 27 cases of sprue, 18 European and 9 Indian, from the clinical, laboratory and therapeutic standpoints, but in this article deals with the blood changes only. Examinations were made on the day of admission to hospital. He divides the patients into two groups, those without marked anaemia and those with anaemia, but the tabular statement shows all gradations and there is no indication in the letterpress as to the number relegated to each group. The red corpuscle limits were 5,200,000 and 857,000, the white cells, 7,800 and 2,300 per cmm., the haemoglobin percentage 103 and 25. Erythroblasts were found in one patient only.

One or two general remarks are of interest : that corpuscle counts, both red and white are normally higher in Bengalees than in Europeans, but the reverse obtains as regards the haemoglobin percentage ; that increase in total leucocytes with eosinophilia is a good prognostic sign, and that reticulocyte counts are important prognostically. It is stated that " most had high eosinophilia," by which the author appears to mean anything over 200–250 per cmm. or a percentage above two ; for only 7 of the 27 had over 4 per cent. All these points need elaboration before they can be accepted. A point in laboratory technique is

worth mention: when the pipette was cleaned with ether the total red cell count was lower than when acetone was used. This is ascribed to the former becoming acid and causing a certain degree of haemolysis.

H. H. S.

PILLAI (M. J. S.) & MURTHI (K. N.). **Radiological Signs in Cases of Sprue. A Study of 9 Cases.**—*Indian Jl. of Med.* 1931. June. Vol. 12. No. 3. pp. 116–118.

A very instructive study of the radiographic findings in nine cases of sprue is recorded. The number is small, since among the nine were acute, subacute, chronic and advanced cases, but if the findings are confirmed they will mark an advance in our knowledge of this disease.

In *acute* cases there was no indication of loss of tone or motility or other change in stomach or intestines. The stomach was empty 2 hours after the barium meal, the hepatic flexure of the colon was reached in 3 hours, and the intestine empty in 6–8 hours. In the *subacute*, there was slight loss of tone and vigour of peristalsis of the stomach with consequent delay there and again in the caecum and colon, though the small intestine rapidly emptied itself. Retention of barium in spots in the upper part of the caecum is interpreted as evidence of ulceration. *Chronic* cases gave similar signs but to a greater degree; the gastric loss of tone and motility was more marked and the barium lay like a pool in the viscus. The small intestine showed no local patches (ulcers), but the caecum was dilated and the transverse colon in one patient contained a pool of barium "like a hammock." There were diverticula in the colon containing barium, especially in the first part of the caecum, and, in the advanced cases, the hepatic and splenic flexures. The authors explain this by saying that concurrently with atrophy of the mucosa, there is fibrotic change in the muscular tissue, the circular fibres being affected before the longitudinal. In three advanced cases the liver was small.

Where ulceration of the mouth and upper part of the alimentary tract was present there were no signs of ulceration of the lower bowel, and where the barium showed diverticular ulcers or inflammation of the colon and lower bowel there was little or no affection of the mouth and upper part of the alimentary tract. The cases may thus be divided into "descending" and "ascending," according to the authors, who regard the former as oral infection spreading down and associated with achlorhydria, and the latter as travelling from the colonic flexures through the caecum upwards. In the former metabolism is much interfered with and milk is not tolerated; *vice versa* in the latter. It was noted also that the barium seemed to have a beneficial effect, possibly by changing the acid colonic contents to alkaline and so affecting the bacterial flora, and partly also by coating the tract and lessening absorption of toxins. At all events the character of the stools underwent a change and the patients stated that they felt better. [The nationality of the patients is not stated, nor details of the symptoms, but no doubt is thrown by the authors on the correctness of the diagnosis. No mention is made of any of these patients coming to autopsy, and the inferential structure built up appears to be somewhat larger than the foundation will support at present. Doubtless further investigations will be made on these lines.]

H. H. S.

THAYSEN (Th. E. Hess). **Pathological Anatomy of the Intestinal Tract in Tropical Sprue.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Mar. 13. Vol. 24. No. 5. pp. 539–548. With 12 figs. on 8 plates. [25 refs.]

A contribution of considerable value in spite of the fact that it consists almost entirely of negative evidence and destructive criticism. The author's patient was a typical case of chronic and relapsing sprue of 6 years' duration with an acute fatal termination. Immediately after death 2,000 cc. of 10 per cent. formalin were injected into the abdomen. A detailed comparison of the morbid anatomy and histology of the intestine from his patient and the findings reported by previous investigators, THIN, BEGG, JUSTI, MANSON-BAHR, FABER, MACKIE, FAIRLEY and others, is presented, and the conclusions are that ulceration is usually absent, but may be limited to ileum or colon, that inflammation of the mucosa is also very inconstant both in occurrence and degree, that, in general terms, the morbid changes reported are so uncertain, that they have no real significance aetiologically. More probably they are of a secondary nature, perhaps resulting from the excessive acidity of the intestinal contents, perhaps from the presence of organisms of relatively low virulence "causing trouble in a debilitated and anaemic patient," in setting up the non-characteristic intestinal ulceration and inflammatory changes observed in some cases of sprue. In brief, the absence of ulceration in the majority of cases effectually rules this out as the cause of sprue (FABER) [though even if it were present in all, it would be no more correct to describe it as the cause than to say that ulceration of Peyer's patches is the *cause* of typhoid fever], while those who regard sprue as a form of amoebiasis or a sequela of dysentery (BIRT) are also in error, seeing that many patients give no history of amoebic infection, nor are amoebae found in the lesions when present. The paper is illustrated by good microphotographs.

H. H. S.

BAUMGARTNER (E. A.) & HUBBARD (Roger S.). **Blood Calcium Studies.**—*Clifton Med. Bull.* 1931. Jan. Vol. 17. No. 1. pp. 28–32. With 1 text fig. [3 refs.]

This short article contains a mine of information and the work described merits a more extensive account or, better perhaps, forms a good basis for fuller investigations. The authors state that their researches received additional stimulus from SCOTT's reports of low calcium values in the blood of sprue patients (this *Bulletin*, Vol. 21, p. 361). During the past five years these estimations have been made on 196 patients, and 46 of them had more than one test; in one patient 20 estimations were performed. Thirty-three were sprue patients and most of those having 3 or more tests were cases of this disease. Other conditions investigated were blood dyscrasias, pernicious and secondary anaemias, purpura; nervous affections, paralysis agitans, hemiplegia, hysteria and psychoneuroses; also gastro-intestinal, genito-urinary, bone diseases and others.

The results are divided into groups according to the amounts of calcium found. The largest number (84) came within 9 and 11 mgm. per 100 cc. The next (78) were those with high values, above 11·1 mgm. 19 of these were sprue cases and 7 pernicious anaemia. Of 28 with

low Ca of 9 mgm. or less, 12 were sprue patients and 1 pernicious anaemia ; 6 had a value between 6 and 8 mgm., of these, 2 were sprue ; and 4 had less than 6 mgm., viz., a patient with tetany following thyroidectomy, a nephritic patient, and two with severe sprue.

To epitomize : Of 15 cases of severe sprue, 2 only showed normal values, 4 had low and 4 high, and 5 had low values at first becoming high on undergoing treatment. Of 18 cases with mild or moderately severe symptoms, 5 had low values becoming high later, when treated, 5 had above 11 mgm., and 8 had normal values. Seventeen cases of pernicious anaemia were studied as control for sprue patients while the authors were investigating the differences between these two diseases ; 7 had high values and only 1 was below 9 mgm. " Cases of sprue are outstanding as having low blood calcium values." [In view of the fact that SCOTT's contention was that, except in severe cases of sprue, the total calcium value was not markedly reduced, but that there was some error in calcium metabolism, a change in the proportion of ionic to combined calcium, if the authors had time and opportunity to investigate this point further, their findings would be of much interest. The agreement so far is fairly close, particularly in their confirmation that the low Ca value becomes high as the patient progresses under treatment (*loc. cit.* p. 362).]

H. H. S.

BAUMGARTNER (E. A.) & HUBBARD (Roger S.). **The Effect of Parathyroid Extract on the Blood Calcium.**—*Clifton Med. Bull.* 1931. July. Vol. 17. No. 3. pp. 143–149. [4 refs.]

Having noticed that patients suffering from various diseases, when treated with parathyroid extract, showed thereafter a high blood calcium while other patients gave an increase when on special diet but without parathyroid, the authors analysed several case records to determine what part, if any, the hormone played in producing the increase. The diseases were various, the chief being sprue and paralysis agitans. It is with the former only that we are here concerned. Of a total of 54 patients with high blood calcium (over 11·6 mgm. per 100 cc.) there were 15 suffering from sprue ; details are given of 11 patients, 8 of them treated by special diet together with parathyroid extract, with or without calcium lactate, and 3 by diet only. Dealing with the former we find :

Patient 1 had a blood calcium of 6·2 mgm. on entry ; after receiving 5 cc. parathormone hypodermically the calcium content was 8·4 mgm. After 4 more doses of 2 cc. it was 8·1 mgm. Dry extract was given and in a week the figure was 9·5 and in 3 weeks 12·9 mgm. Thereafter it fluctuated between 10 and 12 mgm. *Patient* 2 on entry had 8·3 mgm. Calcium lactate (gr. 15 t.d.) and parathyroid extract were given and in 2 weeks the figure was 11·0 and a month later 14·7. *Patient* 3, on entry 10 mgm., after 5 weeks' parathyroid gave 14·1, a fortnight later 10 and two months later, though the lactate also was given, the calcium fell to 7·3. In two others figures of 12·0 and 11·6 were found four or more weeks after treatment, though in one no rise had been seen during the time of administration. In *Patient* 6 the lactate and extract were given and the calcium content rose rapidly to 11·6 in six weeks. The other two gave irregular values, with high figures after ceasing the treatment.

Of the three on dietetic treatment only, one with 11·4 mgm. on entry, fell to 10 and rose again to 11·8 and some months later, when no longer on a strict diet, 12·1 ; the second rose from 8·6 on entry to 12·7 [according

to the tabular statement; the letterpress states "the highest value (11·6) was found a few days after entry"]; the third, 11·6 on entry, fell to 10·7 three weeks later.

To sum up: Of the 15 sprue cases with high blood calcium 8 had been given parathyroid extract, sometimes with calcium lactate, and of 9 sprue cases with calcium above 12·1 mgm. five were given the extract and the five with the highest figures had received this treatment; but on the other hand, as already stated (Patient 3) the calcium may decrease during administration of the drug and fluctuations are not rare.

[An interesting point not considered in this article, interesting especially in view of the fact that the total fluctuated in some and was about normal and remained so in others, would be a study of the interrelations of the ionic to the combined calcium.]

H. H. S.

DENGUE.

Simmons (James Stevens). **Dengue Fever.**—*Amer. Jl. Trop. Med.* 1931. Mar. Vol. 11. No. 2. pp. 77–102. With 8 text figs. [30 refs.]

——. **Recent Advances in Our Knowledge of Dengue Fever.**—*Milit. Surgeon.* 1931. Sept. Vol. 69. No. 3. pp. 266–286. With 7 text figs. [23 refs.] [Army Med. School, Washington.]

In this paper, read at a meeting of a Research Club, the speaker pointed out that during the entire period of the American occupation of the Philippine Islands dengue had been extremely prevalent among the troops and had caused much annoyance and economic loss. Investigation into its etiology and prevention had been carried out continually and the present paper gives an account of some of this work. It had been definitely established that *Aedes albopictus* is a carrier of the virus of the disease and indeed this species of mosquito is more common than *Aedes aegypti* and is probably the chief vector in the Philippines. It was also proved by the same workers that the virus in the mosquito is filtrable, and that Aedes fed on suspensions of infected mosquitoes may become infective for man, thus showing that the virus of dengue need not pass through a mammalian host to render it infective for the mosquito. A study was also made of the clinical aspects of experimental dengue in over 80 cases; it was noted that the duration of the fever varied in different individuals, the average being 4·8 days. One, two, three, four, five, six, seven and nine day fevers were all produced by the same virus. Careful cytological counts were made in a series of cases and charts are displayed giving the temperature curves, the total leucocyte counts and also the differential counts and in addition the ratio of young to mature granulocytes. The chief point noted was the almost invariable leucopenia which usually began on the second day of the fever and progressed to the low point of 2,000 white cells per cmm. on the 4th to the 6th day; the leucocyte count returned to normal several days after the fever had ceased.

A marked immunity to dengue was noted among the locally recruited men, due in the opinion of the speaker to previous attacks.

Experiments on the transmission of dengue to monkeys are described.

D. Harvey.

Snijders (E. P.), Dinger (J. E.) & Schüffner (W.). Over de overbrenging der Sumatraansche Dengue (2e Mededeeling). [**On the Transmission of Dengue Fever of Sumatra (2nd Communication).**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Apr. 1. Vol. 71. No. 4. pp. 345–353. With 5 figs. on 2 plates & 5 charts in text. [6 refs.]

——, —— & ——. **On the Transmission of Dengue in Sumatra.**—*Amer. Jl. Trop. Med.* 1931. May. Vol. 11. No. 3. pp. 171–197. With 8 charts & 12 figs. [7 refs.] [Path. Lab., Medan, & Inst. of Trop. Hyg., Amsterdam.]

This article brings confirmation of the results of transmission experiments by means of *Aedes aegypti* and *albopictus*, after transport from

the tropics to Holland, as reported previously (this *Bulletin*, Vol. 28, p. 619). The results of similar experiments of CLELAND in Australia, SILER in the Philippine Islands and BLANC in Greece are not only confirmed, but rendered much more conclusive by successful transmission in a locality where spontaneous dengue is absolutely excluded. The clinical features of the disease in cases linked together by experimental transmission, either by mosquitoes or by injection of blood from dengue patients, varied considerably, sometimes corresponding more to the classical type of dengue, in other instances showing more resemblance to the so-called five-day fever (VAN DER SCHEER). The authors are strongly inclined to consider both diseases as identical. The epidemiological conditions may alter and an endemic occurrence may change into an epidemic under influence of temporary abundant development of Aedes.

W. J. Bais.

SIMMONS (James S.), ST. JOHN (Joe H.), HOLT (Rufus L.) & REYNOLDS (Francois H. K.). **The Possible Transfer of Dengue Virus from Infected to Normal Mosquitoes during Copulation.**—*Amer. Jl. Trop. Med.* 1931. May. Vol. 11. No. 3. pp. 199–216. With 8 charts. [4 refs.] [Bureau of Science, Manila, P.I.]

A series of five experiments was carefully carried out: Female mosquitoes were fed on cases of dengue and after a suitable period for maturation of the virus batches of male mosquitoes were liberated in the cage; after some days the male mosquitoes were collected and removed to another cage where uninfected female mosquitoes were already confined. These female mosquitoes were then later fed on susceptible volunteers. In one experiment only was dengue produced in the volunteer and the evidence presented as a result of these experiments suggests that if the virus can be conveyed in this way transfer is only effected with great difficulty. The possible transfer of dengue virus from mosquito to mosquito in copulation may therefore be regarded as an unimportant and improbable means of perpetuating the virus of dengue in mosquitoes.

D. H.

HOLT (R. L.) & KINTNER (J. H.). **Location of Dengue Virus in the Body of Mosquitoes.**—*Amer. Jl. Trop. Med.* 1931. Mar. Vol. 11. No. 2. pp. 103–111. With 6 text figs. [Bureau of Science, Manila.]

Aedes aegypti which had been bred out in the laboratory were fed on a dengue patient; 20 days later these mosquitoes were killed and carefully dissected. The legs of ten were ground up and mixed with 0·5 cc. sterile normal human serum and injected into a volunteer. In the same way fluid from ovaries, salivary glands, stomachs and intestines of other mosquitoes from the same batch were injected into volunteers; all developed dengue after the usual incubation period. It would seem from these experiments that dengue infection in Aedes is not limited to any particular part of the insect but is "septicaemic" in character. It appears therefore that the period of maturation of the virus in the mosquito is one of multiplication only and not a cyclic phase.

D. H.

HARGRAVE (W. W.). **Report of Dengue Epidemic in American Samoa.**—*U.S. Nav. Med. Bull.* 1931. July. Vol. 29. No. 3. pp. 565–572. With 1 chart in text.

An historical account of the occurrence of dengue in American Samoa is given. An explosive outbreak took place in the year 1930 and no fewer than 2,842 cases were reported in the two months of May and June; nearly 50 per cent. of the native population were affected. A careful clinical description of the cases is given and the etiology of the outbreak is discussed. The difficulty, in the early stages, of differentiation from influenza is stressed since the typical rash was usually absent in Samoans.

D. H.

HAMLYN-HARRIS (R.). **The Elimination of *Aedes argenteus* Poiret as a Factor in Dengue Control in Queensland.**—*Ann. Trop. Med. & Parasit.* 1931. Mar. 31. Vol. 25. No. 1. pp. 21–29. [9 refs.] [Health Dept., City Council, Brisbane.]

Ae. aegypti, the carrier of dengue, has of late years been spreading along the railway lines in Queensland; the winter temperature here is just not cold enough to kill off all the mosquitoes in sheltered spots. Its survival is also favoured by the fact that the eggs can withstand desiccation and the larvae, as the author has shown experimentally, can survive a temperature as low as 43° F.; they lie motionless at the bottom of the jar but as soon as the temperature is raised they again become active. The spread of the mosquito has coincided with a spread of the disease in a series of epidemics causing much sickness and severe economic loss to the colony.

House to house patrol is most useful in the campaign against *Ae. aegypti* and figures are given showing the marked reduction secured by this measure. Dengue is not endemic in Queensland but is introduced from time to time from Hong Kong, Shanghai or India.

D. H.

DINGER (J. E.) & SNIJDERS (E. P.). Dengue und Gelbfieber. [**Dengue and Yellow Fever.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Sept. Vol. 35. No. 9. pp. 497–526. With 4 figs. & 9 charts in text. [26 refs.]

It has been pointed out by BONNE and others that there is a close resemblance between the group of dengue-like diseases and yellow fever, both in the clinical picture and in the fact that both are carried by the same insect vector and are due to a filtrable virus. It has also been suggested that the dengue group may produce immunity to yellow fever infection, one explanation being that some of these atypical fevers are really abortive yellow fever. Recently support has been given to these ideas by the fact that adult monkeys obtained from areas where dengue is rife are much less susceptible to yellow fever virus than are monkeys obtained in non-dengue areas. With a view to investigating this question the authors carried out the work reported in this paper, which consists in great part of detailed accounts of cases of experimental dengue; the temperature charts are given in detail and white cell counts are shown in graphic form. These experiments, carried out in a country in which the disease does not naturally occur, were on similar lines to other series already described. Aedes mos-

quitoes (*aegypti* and *albopictus*) were fed on dengue fever cases in Medan (Sumatra) and were then sent by ship to Amsterdam where they were kept at a temperature of 27° C. in the Tropical Institute; the mosquitoes were fed on volunteers, and in practically every case produced dengue in susceptible people. As regards the clinical picture of these cases it is pointed out that the same batch of mosquitoes produced different types of fever in different men; for instance one case might show the typical saddle-back temperature curve, another a 5-day fever, and another a continuous fever lasting 7 days; again when the blood of a 5-day fever case was inoculated into another volunteer, it might produce a saddle-back type of fever, and so on. The conclusion is that probably the 5-day fever of van Scheer and the 7-day fever of Rogers are not distinct diseases but simply aberrant forms of dengue.

Susceptibility of Monkeys to Dengue Virus.—26 monkeys, Cynomolgus and Rhesus, were inoculated with infective material, either the blood of dengue patients taken during the first 3 days of the fever or infective Aedes mosquitoes; 14 died, 6 from some obvious cause such as pneumonia, miliary tubercle, ulcerative colitis, but 8, which were carefully examined post mortem, all showed a similar condition, fatty degeneration of the liver and kidneys, swelling of the adrenals and small haemorrhages into the wall of the stomach; in the view of the authors these 8 monkeys died from the effects of the dengue virus. Attempts were made to convey dengue infection back from monkeys to man; on account of the fact that some of the monkeys were suffering from tubercle it was not possible to use their blood as inoculum, so laboratory bred Aedes were fed on the monkeys during the supposed period of infection, and then after an incubation period allowed to bite volunteers; none of these developed dengue.

Experiments designed to show that previous dengue infection in monkeys produces an immunity to subsequent injection of yellow fever virus.—Eleven monkeys were inoculated with infective dengue material and three weeks later with yellow fever virus; 3 of the monkeys developed yellow fever and died, but 8 remained quite normal and the authors consider that this marked and unusual resistance to yellow fever virus was due to the previous infection with dengue. It has been reported that white mice are susceptible to yellow fever virus, an intracerebral injection producing encephalitis in these animals. The authors inoculated large numbers of white mice in this manner with dengue virus but without any effect, and when subsequently tested with yellow fever virus all reacted; no immunity had been acquired. It was also shown that the serum of recovered dengue cases had no neutralizing effect on the virus of yellow fever when tested in monkeys and white mice.

D. H.

Catsaras (Joh). Pathologisch-anatomische Beobachtungen zum Denguefieber.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. May. Vol. 35. No. 5. pp. 278–286. [Evangelismos Hosp., Athens.]

TYPHUS AND UNCLASSED FEVERS.

Dyer (R. E.), Ceder (E. T.), Rumreich (A.) & Badger (L. F.). **Typhus Fever : the Rat Flea, *Xenopsylla cheopis*, in Experimental Transmission.**—*Public Health Rep.* 1931. Aug. 7. Vol. 46. No. 32. pp. 1869–1870. [5 refs.]

The authors refer to previous work which has shown that the virus of endemic typhus fever has been recovered from fleas taken from wild rats trapped at typhus fever foci in Baltimore. More recently the same observation has been made in Savannah and these strains of the virus have been shown to be identical with the virus of endemic typhus recovered from a human case. The recovery of typhus virus from wild rats has also been recently reported by Mooser and Zinsser.

The present paper gives an account of the experimental transmission of endemic typhus in the laboratory by means of the rat flea (*Xenopsylla cheopis*). Metal and glass boxes were constructed and white rats were employed. Fleas were obtained from wild rats trapped in Baltimore. White rats were injected with typhus virus (Baltimore flea strain) and placed in cages with 50 fleas. Two weeks later six fleas were removed from the box, emulsified in normal saline and injected into two guineapigs ; one of these guineapigs developed clinical typhus, and this strain was carried in guineapigs and rabbits for 3 generations ; the rabbits developed agglutinins for Proteus X19 type O. Non-infected white rats were introduced into the cage and two weeks later fleas from these rats were shown to be infective for guineapigs ; also these rats when killed were shown to be infective by inoculation of brain tissue into guineapigs. These and similar experiments were repeated on several occasions with the same results.

It was also shown that guineapigs immune to endemic typhus human strain were also immune to the strain used in the present series of experiments. Careful and repeated search of both boxes and rats failed to show the presence of any blood-sucking parasite other than *X. cheopis*.

D. Harvey.

Kemp (Hardy A.). **Endemic Typhus Fever. Rat Flea as a Possible Vector.**—*Jl. Amer. Med. Assoc.* 1931. Sept. 12. Vol. 97. No. 11. pp. 775–777. [6 refs.] [Med. College, Baylor Univ., Dallas, Texas.]

A number of wild rats had been trapped in an area (Henderson) in Texas where numerous cases of endemic (New World) typhus had occurred. Fleas of the species Xenopsylla and Ceratophyllus were collected from these rats, ground up in saline and injected intraperitoneally into two male guineapigs ; six days later both animals showed marked swelling of the scrotum and febrile reaction. 5 cc. of blood was taken from one of these animals and injected into the peritoneum of another guineapig ; at the same time the scrotum was opened and examined and the typical lesions as described following on infection with typhus virus were discovered. The second guineapig was killed on the third day of the fever and emulsions made of the brain and spleen were inoculated into other guineapigs. All these animals reacted in the typical manner and the virus was carried on through several generations (flea typhus virus). In smears made from the infected tunica Rickettsia bodies were clearly demonstrated. Crossed immunity experiments carried out with the rat flea virus and a

human typhus strain taken from the blood of cases in hospital, were successful; animals infected previously with human virus were immune to rat flea virus and *vice versa*. D. H.

PINKERTON (Henry) & MAXCY (Kenneth F.). **Pathological Study of a Case of Endemic Typhus in Virginia with Demonstration of Rickettsia.**—*Amer. Jl. Path.* 1931. Mar. Vol. 7. No. 2. pp. 95–104. With 6 figs. on 2 plates. [9 refs.] [Harvard Med. School, Boston, & Dept. of Public Health & Hyg., Univ. of Virginia, Richmond.]

This was a case of endemic typhus (Brill's disease) in a farmer in Charlottesville, Virginia; he died on the eleventh day and the post mortem was carried out nine hours later. The Weil-Felix reaction was negative on admission but eleven days later the serum agglutinated proteus X19 in a dilution of 1-2560.

The muscle wall of the heart showed numerous nodules which had originated in the capillaries by a process of endothelial proliferation followed by a perivascular accumulation of macrophages and other cells. These lesions in the endocardium were similar to those described by WOLBACH and TODD in European cases. The most marked involvement was found in the brain; and characteristic diagnostic lesions were found in all sections from various parts of the organ. The earliest lesion is represented by small vessels which show prominence of the endothelium and occasional mitosis of the cells in situ. The lumen of the vessel eventually becomes obliterated and macrophages and cells of the lymphocytic series collect in the perivascular spaces. Sections of skin showed typical vascular lesions which were similar to those in the heart and brain. Although the brain was fixed in formalin, rickettsia bodies were easily found and were clearly brought out in the cytoplasm of the proliferating endothelial cells.

The interesting point was noted that when the American typhus virus is inoculated intraperitoneally into guineapigs it produces an intense reaction in the tunica vaginalis similar to that produced by the virus of Rocky Mountain fever and little or no typical reaction in the brain, whereas when the inoculation of the typhus virus is subcutaneous there is no reaction in the tunica but typical reaction is found in the brain. D. H.

MONTEIRO (J. Lemos). Sobre a presença de *Rickettsia brasiliensis* n. sp. nas cellulas endotheliaes da parede peritoneal em cobaias innoculadas no peritoneo com o virus do typho endemico de S. Paulo. [*Rickettsia brasiliensis* **n. sp. in the Endothelial Cells of the Parietal Peritoneum of Guineapigs after Injection with the S. Paulo Endemic Typhus Virus.**]—*Brasil-Medico.* 1931. Aug. 29. Vol. 45. No. 35. pp. 805–807. With 1 text fig. [12 refs.] English summary. [Butantan Inst., Butantan.]

——. Sur la présence de *Rickettsia brasiliensis* n. sp. dans les cellules endothéliales de la paroi péritonéale, ches des cobayes inoculés dans le péritoine avec le virus du typhus endémique de Sao Paulo.—*C.R. Soc. Biol.* 1931. Oct. 30. Vol. 108. No. 30. pp. 521–524. With 1 text fig. [Refs. in footnotes.] [Butantan Inst., Butantan.]

The author has shown previously that inoculation of the virus of the S. Paulo type of endemic typhus into the anterior chamber of the

eye is followed by the presence of Rickettsia in the endothelial cells of Descemet's membrane. In this paper he shows that intraperitoneal inoculation into guineapigs of the blood or emulsion of the brain substance of an infected animal leads to similar invasion of (or phagocytosis by) the endothelial cells of the peritoneal wall. They are depicted as coccoid or as very small rods, 0·5–1·4 microns in length, within these cells and occasionally in microphages. On the grounds that these Rickettsiae are found in this form of typhus and are possibly peculiar to it, the author proposes the name *Rickettsia brasiliensis.*

H. H. S.

NAGAYO (Mataro), TAMIYA (Takeo), MITAMIRA (Tokushiro) & HAZATO (Hikozemon). Sur le virus du typhus exanthématique. [**The Virus of Typhus Fever.**]—*Bull. Office Internat. d'Hyg. Publique.* 1931. Aug. Vol. 23. No. 8. pp. 1415–1417.

In the course of their work on tsutsugamushi fever the authors used as a control similar inoculations of typhus virus into the eye of normal rabbits. Comparing these two conditions they found that the incubation period was shorter when typhus virus was injected and the changes in the small blood vessels, such as occur in all typhus lesions, were much more marked following injection of typhus virus than when the Japanese river fever virus was employed.

They also found that the virus of typhus can be passed in series in the eye of the guineapig indefinitely, whereas it dies out in rabbits after two or three subinoculations. The Rickettsia (typhus) can be seen in the endothelial cells of the infected eye but are not nearly as numerous as in an eye infected with tsutsugamushi virus. These Rickettsia are similar to the bodies described by ROCHA LIMA (*R. prowazeki*) and the authors point out that this work has for the first time definitely demonstrated these Rickettsia in a laboratory animal and has thus given a new opportunity for the study of these bodies. They give reasons for considering that these bodies are the true virus of typhus, reasons based on a study of the anatomy of the lesions and on the results of immunity experiments.

D. H.

HASLE. Le typhus exanthématique en Annam. [**Typhus in Annam.**] —*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. Feb. Vol. 9. No. 2. pp. 95–99. With 2 charts in text. [8 refs.] [Bact. Lab., Hué, Annam.]

Typhus has not been reported in Annam since 1908, when an outbreak occurred among some Tonkinese coolies who were working on railway construction. The author records three cases which he has recently (1929) observed in Hué. All three had typical mild attacks of fever and in all the Weil-Felix reaction was strongly positive with the indologenic strains of *Proteus vulgaris* X19 but negative with the Kingsbury strain. The author is of opinion that if laboratory methods of diagnosis were more extensively employed, cases of typhus would be discovered to be prevalent among natives in Annam.

D. H.

Vielle (Emile) & Souchard. Sur un cas de typhus exanthématique observé en Cochinchine. [**A Case of Typhus seen in Cochin China.**] —*Bull. Soc. Path. Exot.* 1931. Apr. 15. Vol. 24. No. 4. pp. 302–310. With 9 text figs. [Pasteur Inst., Saigon.]

This was a very severe and apparently typical case of typhus fever in a retired French officer employed by the Michelin Company in prospecting in Cochin China. The points of interest were that a very definite primary ulcer was discovered identical with that seen in Japanese river fever; the Weil-Felix reaction was negative during the fever but positive during convalescence but only with the non indologenic Kingsbury strain of Proteus; guineapigs inoculated with blood from the patient gave a marked febrile reaction after an incubation period of about 10 days and what is more remarkable the majority inoculated in series died of the infection. The authors would have called this a case of Japanese river fever had it not been for the results observed in guineapigs.

D. H.

Lindberg (K.). Un cas de fièvre exanthématique observé dans l'Inde Britannique. [**Case of Typhus seen in British India.**]—*Rev. Méd. et Hyg. Trop.* 1931. May–June. Vol. 23. No. 3. pp. 137–140.

This was a case of fever in an English lady, the wife of a missionary in the Deccan near Poona. She had been ill for about four days and practically the entire skin was covered by a maculopapular rash. The spleen was slightly enlarged, no malarial parasites were found in the blood and a differential blood count gave :—neutrophiles 69 per cent., lymphocytes 29 per cent., mononuclears 2 per cent.

It was discovered that four similar cases had occurred in the last two months, all in wives of missionaries. The fever lasted from 14 to 18 days and the eruption disappeared gradually. The Weil-Felix and Widal reactions were negative in all the cases during the fever but during convalescence a positive Weil-Felix was obtained. In one case there was history of tick bite but no " tache noire " was discovered.

D. H.

Pai (M. N.). **A Case of Tick Typhus in Poona.**—*Indian Med. Gaz.* 1931. Apr. Vol. 66. No. 4. p. 200.

The interesting point about this case was that it was met with in the same unit and in the same locality as two other cases previously described [see this *Bulletin*, Pai, Vol. 26, p. 462]. A sowar of the 3rd cavalry was admitted to hospital with high fever and later developed a profuse macular rash all over the body and on the palms and soles. The Weil-Felix reaction was negative as was the Widal reaction for typhoid and paratyphoid. A tiny sore was noted on the little finger of the left hand but there was no history of tick bite and no ticks were found on the patient.

D. H.

Trowell (H. C.). **A Case of Kenya Typhus in a Mumias Native.**—*Kenya & East African Med. Jl.* 1931. Aug. Vol. 8. No. 5. pp. 142–144.

Typhus in Europeans in Kenya has been reported from time to time but so far not in natives.

The case reported here proved fatal after only ten days. Three days before he felt ill the patient noticed a small ulcer in the pubic region with swelling and pain in the lymphatic glands. On admission he had fever and was already passing into the typhoid state. No ulcer could be found but the left iliac glands were enlarged, soft and tender. A profuse macular rash appeared over the entire body including the palms and soles; intensive jaundice was noted and profuse bile in the stools and

urine. No Weil-Felix reaction was attempted owing to the early conclusion of the case. The Kahn reaction was negative. At post mortem examination a fine cirrhosis of the liver and parenchymatous nephritis were found but the small and large intestine were normal, thus excluding enteric infection.

D. H.

NETTER (Arnold). Existence sur le littoral méditerranéen, en dehors d'une fièvre boutonneuse transmise par le " Rhipicephalus sanguineus," commensal du chien, d'un typhus endémique bénin (maladie de Brill) transmis par un arthropode du rat, le " Leiognathus bacoti." [**Coexistence along the Mediterranean Littoral of Brill's Disease transmitted by a Rat Arthropod and of Eruptive Fever transmitted by the Dog Tick.**]—*Bull. Acad. Méd.* 1931. June 30. Year 95. 3rd Ser. Vol. 105. No. 25. pp. 1017–1021. [21 refs.]

Four monkeys, injected with blood from cases of " benign endemic typhus " which had occurred on board ships of the French navy in Toulon, had all reacted ; they were then sent to Algiers where they were injected with emulsion of brain of guineapigs which at the time they were killed were suffering from fever produced by injection of blood of cases of true or epidemic typhus ; all four monkeys were found to be immune to this virus, controls reacted as usual.

The author considers that this experiment shows that the disease in the ships is a form of mild typhus similar to Brill's disease. He agrees that the recent work showing that eruptive fever can be produced in man by injection of the product of the dog tick clearly differentiates this disease from the Toulon disease and he suggests that there are two distinct diseases (1) endemic typhus carried by an ectoparasite of the rat, a mite or a flea, (2) fièvre boutonneuse, carried by the dog tick *R. sanguineus.*

D. H.

MARCANDIER, PLAZY, LE CHUITON & PIROT (R.). Transmission au singe de la fièvre exanthématique observée à bord des navires de guerre à Toulon. Ses rapports avec le typhus exanthématique. [**Transmission to Monkeys of the Virus of Eruptive Fever occurring in Warships at Toulon. Comparison with Exanthematic Typhus.**] *Bull. Acad. Méd.* 1931. June 23. 95th Year. 3rd Ser. Vol. 105. No. 24. pp. 1012–1015. [1 ref.]

The method employed was to inoculate the blood of patients suffering from the type of eruptive fever met with on the ships of war in Toulon harbour into monkeys which were afterwards sent across to Algiers where they were tested with inoculations of the local virus of true typhus (see above). Three experiments are described.

A large number of mites were collected from the ships in which most cases had occurred ; these mites were crushed up and the fluid was injected into a monkey ; this monkey did not react ; tested six weeks later with typhus virus it reacted in the usual way (non-immune).

In the last experiment 15 cc. of blood from a case of fever was injected into a monkey which did not react ; this monkey when tested a month later reacted to typhus virus. The authors consider that these experiments show that the fever met with in the ships in Toulon is a mild form of true typhus resembling Brill's disease and

they suggest that it is probably carried by an ectoparasite of the rat, a mite or a flea and that it differs from Marseilles eruptive fever which is carried by a tick and in which the reaction in monkeys caused by injection of blood from a case of fever does *not* immunize against subsequent injection of true typhus virus.

D. H.

Plazy, Marcandier, Germain & Pirot. Contribution à l'étude des rapports du typhus exanthématique et de la fièvre exanthématique. Recherches cliniques et expérimentales. [**Clinical and Experimental Comparison between Eruptive Fever and True Typhus.**]—*Bull. Acad. Méd.* 1931. July 21. Year 95. 3rd Ser. Vol. 106. No. 27. pp. 51–56. With 4 text figs. [1 ref.]

This paper was the opening one in a discussion on the identity of the virus of Toulon fever with that of true typhus. The authors bring forward clinical and experimental proof of their identity.

The patient, a sailor who had been on leave in his native Tunis, on return became gravely ill with all the symptoms of true typhus: deep stupor, profuse rash, injected conjunctivae and a Weil-Felix reaction positive in 1/3000 dilution, with later delirium. The suggestion was made to treat him with injections of whole blood from a man recently recovered from an attack of Toulon fever; accordingly 3 doses of 20 cc. of whole blood were injected intramuscularly with dramatic success, the temperature dropping by lysis, delirium disappearing and the stupor clearing up; so marked was the effect of these injections that the authors are convinced that the antibodies in the blood of the case of Toulon fever were specific for the typhus case.

As regards the experimental proof, blood from the case of typhus produced the typical febrile reaction when injected into a monkey but the same blood injected into another monkey which had nine months previously reacted to the Toulon virus showed no reaction to the typhus blood.

In the discussion that followed it was stated that the fever met with on board the ships in Toulon where no ticks could be found was probably true mild typhus and differed from the tick borne fever of Marseilles, the case of Toulon fever referred to in the paper being an example of mild typhus. One speaker referred to the recent work of Dyer in America, who had shown that the virus of Brill's disease is present in rat fleas and suggested that the same might be true of the disease on the war ships, the limited number of cases being due to the fact that the rat flea only occasionally bites man and the mildness of the disease to the disease being modified by passage through the rat. [See also this *Bulletin*, Vol. 26, p. 457.]

D. H.

Blanc (Georges) & Caminopétros (J.). La fièvre boutonneuse (fièvre exanthématique de Marseille) en Grèce. Expériences de transmission par la tique du chien (*Rhipicephalus sanguineus*). [**Eruptive Fever in Greece, Attempts to transmit it by the Dog Tick** *R. sanguineus*.]—*Bull. Acad. Méd.* 1931. Apr. 14. Year 95. 3rd Ser. Vol. 105. No. 14. pp. 620–624. [8 refs.]

This disease has now been reported in Greece and undoubtedly has been hitherto overlooked.

The authors have carried out a series of experiments to confirm the

work of DURAND, BRUMPT and others on its transmission by the tick *R. sanguineus*. Their first attempt to transmit the disease, with ticks collected in Athens, failed; however when they repeated the experiments with ticks from the district of Volo, where the disease is prevalent, they were successful.

Nine experiments were undertaken and 33 subjects were inoculated. All were suffering from G.P.I. or dementia praecox and it was hoped that the resulting fever might have a beneficial action on their mental disability. 373 ticks collected in Athens were employed without a positive result, whereas in one experiment in which only 11 ticks collected in Volo were crushed up and injected a typical attack of the fever was produced in the inoculated man. Batches of ticks from Volo were divided into males and females and successful results were obtained with both emulsions.

D. H.

BLANC (Georges) & CAMINOPÉTROS (J.). Nouvelles recherches expérimentales sur la fièvre boutonneuse (fièvre exanthématique). [**New Researches on Eruptive Fever.**]—*Bull. Acad. Méd.* 1931. June 2. Year 95. 3rd Ser. Vol. 105. No. 21. pp. 884–890. [7 refs.] [Summary appears also in *Bulletin of Hygiene.*]

The authors summarize a series of experimental findings with regard to the presence and persistence of the virus of *fièvre boutonneuse* in the blood of infected persons. They have succeeded on 50 occasions in transmitting the infection from man to man by the intravenous injection of infected blood. (The experiments were carried out during a study of the effect of this mild febrile infection on certain nervous disorders, especially on dementia praecox.) They note that a typical reaction, with the characteristic generalized eruption, is by no means always obtained; but the significance of an atypical febrile reaction is often evidenced by the fact that a further passage results in a typical attack of the disease. These observations lend considerable support to the conclusion, arrived at by other observers on epidemiological grounds, that abortive and atypical attacks—the *formes frustes*—occur under natural conditions.

The blood of a patient suffering from the disease is infective from the onset of the febrile reaction, whether an eruption occurs or not; and remains infective through the whole febrile period. Similar observations have been made on an experimentally infected monkey. The virus is present in the serum, separated from the cellular elements of the blood, and in the leucocytes separated from the plasma. It has also been demonstrated in the cerebrospinal fluid in two cases in which specimens were withdrawn during the eruptive stage. In neither case was there any clinical evidence of meningeal lesions.

W. W. C. Topley.

BLANC (Georges) & CAMINOPÉTROS (J.). Le virus de la fièvre boutonneuse (fièvre exanthématique) provenant du sang de malades ou de l'organisme de la tique est filtrable. [**Filtrability of the Virus of Eruptive Fever.**]—*C. R. Acad. Sci.* 1931. June 8. Vol. 192. No. 23. pp. 1504–1505. [2 refs.] [Summary appears also in *Bulletin of Hygiene.*]

The authors have carried out a series of experiments on the filtrability of the virus of *fièvre boutonneuse*, using as the material for

filtration the serum of infected patients, or saline extracts prepared by grinding specimens of the tick that serves as the vector of infection—*R. sanguineus*. The filtrates were tested by intravenous or subcutaneous inoculation into susceptible human subjects. It is pointed out that one of the great difficulties encountered in these experiments is the slight susceptibility of human subjects to small doses of the virus, and their varying susceptibility to relatively large doses. Several of the experiments yielded entirely negative results, and in others the symptoms which followed inoculation of the filtrates were slight and atypical; but in a few cases a characteristic reaction was obtained, particularly with the filtrates from infected ticks. The candles used in filtration were Chamberland L_2 and L_5.

W. W. C. Topley.

Blanc (Georges) & Caminopétros (J.). Le virus de la fièvre boutonneuse est héréditaire chez la tique *Rhipicephalus sanguineus*. [**Transmission of the Virus of Eruptive Fever through the Developmental Stages of** *R. sanguineus*.]—*C. R. Acad. Sci.* 1931. June 22. Vol. 192. No. 25. pp. 1682–1684.

It has been demonstrated experimentally that eruptive fever can be carried by the dog tick *R. sanguineus*, but the question of the conservation of the virus apart from man is still unanswered. The authors bring forward epidemiological and experimental evidence to show that the virus is one of the tick and not of domestic animals.

It has been noted in Greece that the disease is most prevalent in the district of Volo; a few cases have occurred in Piraeus but none in Athens or in Crete. Now such animals as dogs, rats, rabbits, etc. are found in these places about equally and ticks are found on all these animals, yet only the Volo ticks proved infective and occasionally ticks from Piraeus; the ticks collected from Athens and Crete were non-infective.

Numerous ticks were collected from Volo and proved to be infective; eggs deposited by some of these ticks in captivity were also shown to be infective; some eggs were allowed to mature and the larvae emerging from these eggs also proved infective. There was definite evidence of multiplication of the virus in the tick.

D. H.

Blanc (Georges) & Caminopétros (J.). Recherches expérimentales sur la sensibilité au virus de la fièvre exanthématique des animaux domestiques porteurs de *Rhipicephalus sanguineus*. [**Susceptibility of Domestic Animals harbouring** *R. sanguineus* **to Eruptive Fever.**]—*C. R. Acad. Sci.* 1931. July 27. Vol. 193. No. 4. pp. 258–259. [1 ref.]

The authors think that the virus of exanthematous fever, harboured by the dog tick *R. sanguineus*, is passed from adult to larvae. It has been suggested however that some of the domestic animals on which the tick lives might be the hosts of this virus. To test this hypothesis the authors experimented with dogs, rabbits, rats, pigs, sheep and pigeons.

Nine young dogs were injected with blood taken from typical cases of the disease and also with the fluid from an emulsified product of

numerous ticks, but the dogs remained in perfect health. 30 cc. of blood taken from the dogs was injected into human volunteers without result nor did ticks fed on these dogs become infective. Similar negative results resulted with rats, rabbits, sheep and pigeons.

The authors claim that their experiments show that these animals, usually in close contact with man and which normally harbour the tick, are insusceptible to the disease.

D. H.

Blanc (Georges) & Caminopétros (J.). De la sensibilité du spermophile (*Citillus citillus*) au virus de la fièvre boutonneuse. [**Susceptibility of the Spermophile to Eruptive Fever.**]—*C. R. Acad. Sci.* 1931. Aug. 24. Vol. 193. No. 8. pp. 374–375. [1 ref.]

The authors in their search for an animal susceptible to the virus of eruptive fever have shown that the ordinary laboratory animals are insusceptible, as are domestic animals such as the pig, goat, pigeon and sheep; they have now discovered that the white mouse is partially susceptible and that the wild rodent of Macedonia *Citillus citillus*, is extremely so, more so indeed than man, although the animal shows no signs of illness and does not die of the disease. The animal can be readily infected by inoculation of the blood of a case of fever or of the tick *R. sanguineus*. Infection can be readily demonstrated by inoculation from this animal into human volunteers who invariably develop severe attacks of the fever.

D. H.

Troisier (Jean) & Cattan (Roger). Fièvre exanthématique inapparente de l'homme provoquée par *Rhipicephalus sanguineus*. Sa virulence pour le singe et le cobaye. [**Inapparent Eruptive Fever in Man conveyed by *Rhipicephalus sanguineus*. Effect in Monkey and Guineapig.**]—*C. R. Acad. Sci.* 1931. July 6. Vol. 193. No. 1. pp. 91–93.

The authors collected 60 ticks from a dog which had never been in contact with any one suffering from eruptive fever. These ticks were crushed up in normal saline, the fluid was filtered and injected into an adult suffering from a nervous disease; the patient showed no fever or other symptom but the Weil-Felix reaction which had been previously tested on several occasions with negative result gave a positive reaction of 1/150 14 days after the injection; five days later it gave a reaction in a dilution of 1/250 and gradually declined to 1/50. 20 cc. of blood taken from the patient during this period was injected into a monkey which on the 11th day developed fever and gave the typical febrile reaction; the monkey also developed a rash on the lips and eyelids. A guineapig inoculated with 4 cc. of blood from the patient also ran a typical fever curve and blood was injected into a monkey from this guineapig; although the monkey did not develop fever it showed a typical papular rash; one of these papules was excised and examination showed the typical histology of the exanthematous papule.

D. H.

LUTRARIO (A.). Les fièvres exanthématiques en Italie. [**Eruptive Fevers in Italy.**]—*Bull. Office Internat. d' Hyg. Publique.* 1931. Aug. Vol. 23. No. 8. pp. 1403–1410. [4 refs.]

The author has extended his survey of the prevalence of these fevers in Italy and has made enquiries from medical men all over the country. The doctors in Naples are convinced that they do not occur in that city and have not been overlooked.

Professor PREVITERA reports seven cases from Catania which he had diagnosed as mild typhus, in 4 of which the Weil-Felix reaction was positive. Dr. Lutrario says that true typhus is unknown in Italy. By far the greatest number of cases of eruptive fever occur in the suburbs of Rome and have been carefully studied by Dr. SAMPIETRO and others. From the clinical description it is evident that the disease in Italy is similar to that in France ; the disease is seasonal (summer) and occurs in the country or suburbs and not in the towns, exactly the reverse of true typhus in other countries, where it occurs in the winter and specially in the crowded slums of cities. As regards the Weil-Felix reaction, SAMPIETRO has obtained a considerable percentage of positive reactions and he considers that if other workers tested the sera late in the fever or in early convalescence and used several different strains of *Proteus vulgaris* X19 they would also obtain positive results. Italian observers, while admitting the close relationship clinically between this disease and Brill's disease, are not yet prepared to say that they are identical but rather that they are varieties of the same disease with slight differences due to the fact that the vector is not the same.

D. H.

CORINALDESI (Silvio). Sulla febbre esantematica mediterranea. [**Mediterranean Eruptive Fever.**]—*Policlinico.* Sez. Prat. 1931. Aug. 24. Vol. 38. No. 34. pp. 1229–1234. [8 refs.] [S. Maria della Scaletta Hosp., Imola.]

Two typical cases are recorded by the author because they were observed in the Province of Emilia (Italy) where such had not been previously reported. The first, however, had spent two days at Marseilles on her way, and the second had shortly before been in Florence and across the Apennines.

H. H. S.

i. NAGAYO (Mataro), MIYAGAWA (Yoneji), MITAMURA (Tokushiro), TAMIYA (Takeo), SATO (Kiyoshi), HAZATO (Hikozaemon) & IMAMURA (Arao). Ueber den Nachweis des Erregers der Tsutsugamushi-Krankheit, der *Rickettsia orientalis.* [**Demonstration of the Agent of Tsutsugamushi Disease,** *R. orientalis.*]—*Japanese Jl. Experim. Med.* 1931. Mar. 20. Vol. 9. No. 2. pp. 87–150. With 18 text figs. & 47 figs. (21 coloured) on 13 plates. [Refs. in footnotes.] [Imperial Inst. for Infectious Diseases, Tokyo.]

ii. ——, TAMIYA (Takeo), MITAMIRA (Tokushiro) & SATO (Kiyoshi). Sur le virus de la maladie dite tsutsugamushi.—*Bull. Office Internat. d' Hyg. Publique.* 1931. Aug. Vol. 23. No. 8. pp. 1411–1414.

i. In 1915 the authors described bodies staining by Giemsa in the lymph glands and spleen of men suffering from Japanese river fever,

and in 1924 definite diplococcal and short bacillary forms of the same organism stained by Giemsa and Azur II [see this *Bulletin*, Vol. 23, p. 362]. It was then asserted that these organisms were the cause of the disease and belong to the Rickettsia. In 1928 ISHIWARA and OGATA made the important observation that injection of infective material from a case of the disease into the testicle of a rabbit produced a specific local inflammation which could be passaged from rabbit to rabbit for many generations (80) ; in the tissues in such lesions the authors demonstrated small diplococcal and bacillary forms which, however, they were inclined to regard as bacteria. At this date, 1929, the matter was still in doubt ; some research workers were of opinion that these bodies were merely granules in the protoplasm of the cells, others thought that they were bacteria and still others that they were Rickettsia and the cause of the disease.

Accordingly, the authors undertook the extensive research which is detailed in this present communication, in the course of which over 1,000 animals, rabbits, monkeys and guineapigs, were utilized. This research was the outcome of the discovery, made by the authors, that the injections of infective material from a case of Japanese river fever, or from an infected animal, into the eyeball of a rabbit produced a specific local inflammation from which the animal in the course of a week or so made a complete recovery. This inflammation, it was found, could be passaged from animal to animal by means of infected aqueous humour for many generations. Four strains of the virus were employed, three from human cases subinoculated into monkeys and one strain which had been maintained for several generations in the testicle of rabbits, then inoculated into monkeys and white rats and eventually passaged in the eyeball of rabbits. The technique of the injection of the material into the eyeball is described and a careful, clinical description of the local effects in the eye of the rabbit and guineapig follows. The inflammation begins as an iritis with pericorneal injection followed by hyperaemia, oedema and cloudy swelling of the cornea ; injection of fluid from such a lesion into the eye of another rabbit invariably produced a similar condition. The incubation period varied slightly but was usually from 7 to 9 days, and the duration of the inflammation was as a rule about two weeks. In rabbits and guineapigs the infection was confined to the inoculated eye and no general symptoms were noted, nor was the other eye affected, but in monkeys although the eye symptoms were similar general infection followed with fever resembling that in man. Whether the infected material used as inoculum was blood from a case of the fever or lymph gland or spleen of an infected rat or monkey, the inflammation produced in the eyeball was invariably the same, and so constant was the success of this method of inoculation in the hands of the authors that they are prepared to say that if a negative result is obtained it is definite evidence of the absence of the virus from the inoculum.

A careful and detailed description of the histo-pathology of the infected eyeball is given ; many were removed and examined by section and by stained film ; the chief point noted was that in various parts of the eye, such as the aqueous humour, the iris and especially in the endothelial cells of Descemet's membrane enormous numbers of Rickettsia-like bodies were constantly found. The authors are of opinion that these are the cause of the disease and propose for the organism the name of *R. orientalis*. There follows a very careful description of the morphological characters of this Rickettsia which

like other members of the genus is readily stained by Giemsa and is Gram negative, and although it shows a certain amount of Brownian movement has no true motility. The authors have also succeeded in growing this organism in tissue culture, the method of which is fully described; the tissue employed was a portion of the endothelium of Descemet's membrane removed from the normal eye of a rabbit along with normal aqueous humour and a little rabbit plasma; the inoculum was as a rule infected aqueous humour. After a few days incubation enormous numbers of Rickettsia appeared in the cultures and the organism has been passed through many generations and 85 days after isolation showed no loss of virulence and produced the typical inflammation in the eye of a rabbit.

Another interesting point noted was that an eye which had recovered from the inflammation was immune to further injections of infective material.

The whole work was carefully controlled and is profusely illustrated by means of coloured plates, charts and tables.

ii. A report to the Office International on the recent important work on Japanese river fever summarized above.

D. H.

OGATA (Norio). Aetiologie der Tsutsugamushikrankheit: *Rickettsia tsutsugamushi*. [**Aetiology of Tsutsugamushi Disease.**]—*Zent. f. Bakt.* I. Abt. Orig. 1931. Oct. 1. Vol. 122. No. 4/5. pp. 249–253. With 2 text figs. [14 refs.] [State Univ. of Med., Chiba, Japan.]

The author gives an historical account of the disease as it has occurred in Japan and elsewhere, and remarks on its limitation to certain districts and areas of the country situated along the course of the great rivers and its seasonal distribution following the floods due to the melting of the snows on the mountains. The vector, as is now well proved, is the larval stage of the mite *Trombicula akamushi* which is practically microscopic in size, thus adding greatly to the difficulties of investigation. Although the great majority of cases are due to the bite of this mite the author has seen cases of direct infection from a previous case and has also observed one fatal case in a laboratory attendant who had pricked his thumb with a needle charged with infective material. For nearly 50 years Japanese investigators have been studying the symptomatology and etiology of the disease and, of recent years, the development of the arthropod vector; yet the actual cause or germ of the disease has up till recently been unknown although various bacteria, protozoa and filtrable viruses have been from time to time incriminated. The animals used in experimental research were first of all Japanese apes, but these are costly and cannot be employed in large numbers, although it has been proved that they are susceptible. Latterly rabbits and guineapigs have been employed, and in 1928 the author introduced his method of intratesticular inoculation in rabbits. Such injection of infected material is followed in a few days by the development of a typical orchitis characterized by swelling and hardness of the gland. The virus can in this manner be passed in series for many generations, emulsion of the testicle being used as inoculum, thus preserving the virus which does not lose in virulence for rabbits or apes. It is obvious that the germ or virus of the disease must be present in the infected testicle, and when sections or smears were made from such an organ Rickettsia-like bodies could be demonstrated in large numbers chiefly in the protoplasm of the histiocytes. In control animals (either normal or animals infected with known pathogenic bacteria) no such bodies could be found and bacterial cultures made from the infected testicles proved to be sterile. It has however been possible to keep the virus alive in tissue culture for some weeks without loss of virulence.

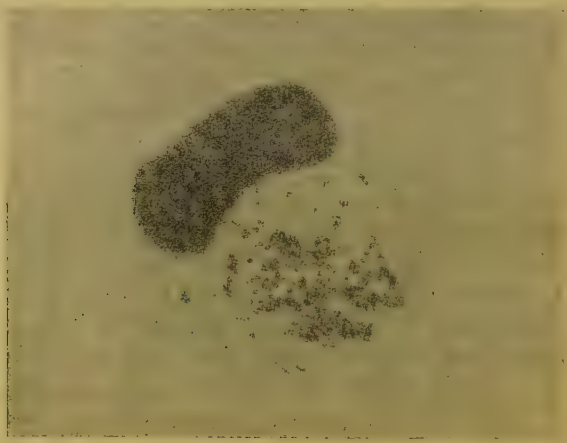
In its properties this organism resembles closely other Rickettsia bodies such as *R. prowazeki* which is found in lice which have been fed on typhus patients, and *R. rickettsiae* found in the tick which carries Rocky Mountain fever.

The author gives the name *R. tsutsugamushi* to the bodies which he has described in the testicles of rabbits. NAGAYO demonstrated similar bodies in the anterior chamber of the eye in rabbits in 1930 and has called his organism *R. orientalis,* and KAWAMURA who has demonstrated rickettsia bodies in the arthropod carrier has called them *R. akamushi* ; it is probable that these are all one and the same, and in that case the name first given should stand.

D. H.

KAWAMURA (R.) & IMAGAWA (Y.). Die Feststellung des Erregers bei der Tsutsugamushikrankheit. [**Confirmation of the Infective Agent in Tsutsugamushi Disease.**]—*Zent. f. Bakt.* I. Abt. Orig. 1931. Oct. 1. Vol. 122. No. 4/5. pp. 253–261. With 9 text figs. [7 refs.] [Path. Inst., Faculty of Med., Niigata, Japan.]

The authors have employed the method of Ogata, injection of infected material into the testicle of rabbits, and have confirmed his finding of Rickettsia bodies. They have also used the method of Nagayo (inoculation of anterior chamber of eye of rabbit) with like results. They have also injected infective material into the peritoneum of rabbits and guineapigs and have succeeded in clearly demonstrating Rickettsia bodies in the endothelial cells of the mesentery. Some excellent microphotographs are reproduced.



Rickettsia akamushi in endothelial cells of Descemet's membrane in a rabbit, following intraocular injection with guineapig's retina. (Ito type; Regaud fixation; Giemsa stain.)

[Reproduced from the *Zentralblatt für Bakteriologie.*]

The authors collected infected field mice from the endemic areas and injected emulsions of the spleen into apes and rabbits ; the monkeys developed fever and the rabbits orchitis, and in the cells of the testicles the Rickettsia bodies could be readily identified.

Larvae of the Trombiculae were collected from infected field mice

and were fixed and cut in serial section, and in one instance masses of Rickettsia bodies were found in the cells of the salivary glands. The authors suggest the name of *R. akamushi* for this organism; their reasons for considering this parasite to be the cause of the River fever are as follows:

1. These bodies were found in the salivary gland of an akamushi taken from an infected field mouse.
2. They were similar to the bodies found in the testicle of rabbits following an injection with emulsion of the spleen of infected field mice and also in the anterior chamber of the eye of rabbits similarly inoculated.
3. These bodies can be readily distinguished from granules in the cells by reason of their peculiar staining qualities.
4. They are intracellular; and for the most part included in endothelial cells and histiocytes.
5. They can be easily distinguished from ordinary bacteria by staining properties and cultural methods.
6. They cannot be found in control animals.
7. They show similar properties to other known Rickettsia.

D. H.

Wolff (J. W.). **Observations on the Weil-Felix Reaction in Tsutsugamushi Disease.**—*Jl. Hygiene.* 1931. July. Vol. 31. No. 3. pp. 352–360. With 3 charts. [16 refs.] [Path. Lab., Medan, Sumatra.]

In the Japanese type of tsutsugamushi fever it is generally stated that the Weil-Felix reaction is negative, but the strain employed in Japan is the usual X19 Warsaw type.

In Malaya Fletcher found that the type of tsutsugamushi fever met with gave a positive Weil-Felix reaction with the Kingsbury type of proteus in a dilution of 1/200 approx. Cases of scrub typhus however gave a positive reaction in a dilution of 1/1000 or higher, and Fletcher looked upon this difference as one point in the differentiation of these two diseases; practically the only other difference being the absence of a true primary ulcer in the scrub typhus. In the present study 45 cases of tsutsugamushi disease type Schüffner, Dutch Indies, are dealt with. These 45 cases were all typical clinically and all showed the typical primary ulcer and bubo. 30 out of the 45 gave positive reaction with the Kingsbury strain of proteus. Saline emulsions both of the Warsaw and the Kingsbury type were employed; these were killed by 1 per cent. formalin; half of each sample of serum tested was heated for half an hour at 58° C., and both heated and unheated sera were utilized in dilutions up to 1/1000. All the sera, heated or unheated, were negative to the Warsaw strain. As regards the Kingsbury strain 30 of the cases gave strong positive reactions with this type; usually this positive reaction did not appear till near the end of the fever or just after the fever had ceased. In the fifteen cases in which the reaction was negative with both type strains the sera were tested during the fever and for some time after the fever ceased. The majority of the cases gave a reaction up to a 1/1000 dilution. In one interesting case a patient was admitted with tropical typhus and recovered; six months later he was admitted with tsutsugamushi fever with typical primary sore and bubo; the Weil-Felix reaction was positive in the same manner on each occasion.

The fact that it has been shown that the Weil-Felix reaction may be positive in tsutsugamushi fever up to a dilution of 1/1000 leaves

the presence of the primary sore as the only point of difference between this disease and scrub typhus. The author suggests that these diseases are caused by the same virus but carried by a different vector, the one causing a local ulcer and the other not.

D. H.

CARRION'S DISEASE.

BATTISTTINI (Telémaco). La verrue péruvienne. (Sa transmission par le phlébotome.) [**Verruga peruana. Transmission by Phlebotomus.**]—*Rev. Sud-Américaine de Méd. et de Chirurg.* Paris. 1931. July. Vol. 2. No. 7. pp. 719–724.

The author refers to the work of TOWNSEND (1913–14), who came to the conclusion that the malady of Carrion was conveyed by a blood-sucking insect and incriminated the Phlebotomus to which he gave the name *verrucarum*. This work however was not accepted as conclusive by Peruvian observers. Later the Harvard Commission on somewhat slender grounds inclined to the opinion that the disease was conveyed by a tick.

An investigation made by the author and his confrères in 1926 in the absence of an entomologist was inconclusive, but in 1928 the services of Dr. A. N. SAINZ were made available. The experimental animals employed were Macacus monkeys which are known to be susceptible to the virus and in whose blood the presence of the parasite is readily demonstrated either by culture or by the microscope.

Flies obtained in the town of Huarochiri, where numerous cases of the disease were occurring, were allowed to bite a monkey and *Bartonella bacilliformis* was recovered in pure culture from the blood and also demonstrated in stained films. [In the single experiment detailed in the paper there is some confusion in the dates as the incubation period appears to be only 2 days.] 220 flies were collected from houses in which cases of Carrion's disease were present and from five batches pure cultures of Bartonella were obtained. Also in two experiments in which Macacus monkeys were inoculated with emulsions of Phlebotomus, 19 in one case, 15 in the other, Bartonella was recovered from the blood of the monkeys in pure culture after an incubation period of 14 days.

The flies utilized in these experiments were identified as *P. verrucarum* (Townsend) and two new species classified as *P. noguchii* and *P. peruensis*.

D. Harvey.

JANTZEN (Walther). **Multiple Verruga-like Nodules on the Skin—Case Report.**—*Nineteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1930. pp. 115–119. With 2 text figs. [Truxillo Railroad Company Hosp., Puerto Castilla, Honduras.]

A similar case to the one described in this paper was observed in this Hospital and a description published by DA ROCHA LIMA in 1925. [See this *Bulletin*, Vol. 23, p. 364.]

A native of Honduras, aged 41, was admitted to the Truxillo Railway Hospital with several skin tumours; he had no systemic illness and

appeared in robust health. The largest tumour was situated on the thigh and resembled closely a verruga lesion ; it was of a red colour and prone to bleed. Other similar but smaller tumours were found on the left forearm and on the face ; the right arm had been amputated in a machete fight. Two of the largest tumours were removed and sent for examination ; the patient then left hospital and was not again seen. The report received was similar as regards the histology to that previously published by Rocha Lima, but in his case included bodies (Bartonella) were readily found in the cells whereas in the Jantzen case no such bodies could be demonstrated. The tumours consisted in great part of angiomatous tissue, the blood spaces being lined by endothelial cells ; in certain places these cells by proliferation had produced small endotheliomata. The tumours therefore were histologically similar to verruga lesions, but in the absence of systemic symptoms and of the cell inclusions it was not possible to make any definite diagnosis. The further history of the case would be of interest.

D. H.

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i. Mackehenie (Daniel). L'érythropoièse dans l'anémie grave de la maladie de Carrion (verrue péruvienne).—*Rev. Sud-Américaine de Méd. et de Chirurg.* Paris. 1930. June. Vol. 1. No. 6. pp. 563–569.

ii. Monge (Carlos) & Weiss (Pedro). A propos de l'hématologie de la maladie de Carrion ou verrue péruvienne.—*Ibid.* pp. 570–574. With 5 coloured plates.

HELMINTHIASIS.

HEYDON (G. M.) & GREEN (A. K.). **Some Worm Infestations of Man in Australia.**—*Med. Jl. Australia.* 1931. May 23. 18th Year. Vol. 1. No. 21. pp. 619–628. With 1 text fig. [20 refs.]

Trichostrongylus. Eggs corresponding to trichostrongylus were noted on the Atherton tableland in human faeces. These, free from earth, were despatched to Townsville in tins and at the time of their examination were commonly a week old. They were then cultured and the infective larvae thus obtained from man were fed to four kids about a fortnight old. Four controls from the same litters remained free from infection to D.C.F. and to " the much more delicate method of culture of large samples for larvae," nor were adults found in those of them who were killed after 5 weeks, and examined. From the experimental kids there were obtained in all 62 *Haemonchus contortus*, about 2,200 trichostrongyles, of which about 1,200 were male *T. colubriformis* and nine were male *T. extenuatus*. One *Trichuris ovis* was also found. It was judged that reinfection of kids from their own faeces could be excluded owing to the dry state of the yards and that, though all possibility of naturally acquired infection could not be entirely excluded, these uncertainties were small since none of the controls became infected. [It should be noted however that unquestioned acceptance implies the presence of *Haemonchus contortus* and of *Trichuris ovis* in man.] Trichostrongylus eggs were found by Willis's technique in 24 of 6,983 persons from the Atherton tableland, in 3 of 5,263 persons from the Babinda-Gordonvale district, and in one from Atherton town who had previously lived near Babinda. Of dried infective larvae kept in a dark cupboard during winter, 75 per cent. recovered after 52 days and lived in water for many days, while of dried larvae kept between 1° C. and 6° C. many survived 116 days. " In earth or coiled in masses on herbage they can survive for still longer periods in the dry state." Sunlight however kills them readily even when the temperature is kept below 20° C. Efforts to make them enter the skin of young rats by Goodey's method failed, nor was application of larvae to the skin of man followed by any irritation or appearance of eggs in faeces, so that at least the common method of infection is by mouth ; and although swallowing of larvae in water or dust is possible the most common means is believed to lie in the Nebuchadnezzar-like habit of chewing grass, a habit noted in one of the infected children. No symptoms were found referable to infection. Cure as judged by Willis's technique was obtained by 1, 2, or 3 treatments with oil of chenopodium 0·18 mils for each year of age.

Strongyloides stercoralis. In these week-old stools *S. stercoralis* was found to Willis's technique 7 times in [appparently about 800] aborigines and 7 times in 23,000 non-aborigines, it being held apparently that floatation displays them satisfactorily. A rhabditis is described.

Larval cultures. In these week-old stools larval culture is held most satisfactory. A 20 gm. sample is disintegrated in a large amount of water, the suspension sedimented and the sediment poured on to the surface of a quantity of dry earth in a tin. Most of the eggs are held to be filtered out on the surface which should then be broken up, and the top inch extracted after 5 or 6 days. " The hookworm larvae which in a culture such as has been described climb the sides of the

tin are but a small minority." [The tins were however untrapped and no evidence is offered for this statement.] Under the heading of orientation of the thermo-tropic larvae is the following :—

" The larvae are placed on a slide in a small drop of water and a large drop of thick agar at a temperature below 45° C. is allowed to fall on them ; a cover glass is applied immediately. When the agar has set, a hot glass rod is brought close to the upper surface of the cover glass ; many of the larvae will be seen to congregate at a point immediately beneath the rod, trying to bore through the cover glass ; the hot rod is then lowered into light contact with the cover glass for an instant and then removed.

" If the preparation is then placed under the microscope, a number of the larvae are found to have been killed in such a position that a good end-on view is obtained ; they are held in this position by the agar. As the anterior extremities are immediately beneath the cover glass, oil immersion lenses of short working distance may be used."

Clayton Lane.

Nazmi (M.). **The Microscopical Diagnosis of Helminth Infection in Egypt.**—*Jl. Egyptian Med. Assoc.* 1931. July. Vol. 14. No. 7. pp. 412–418.

" Inasmuch as a practitioner hardly ever fails to apply his stethoscope to the patient's chest . . . . the examination of his urine and faeces ought to be just as important, although less impressive, than the world-wise attitude the doctor assumes with the earpieces in place and silence enjoined." Dependable directions are given for the examination of urine (particularly the complete need for determining whether schistosome ova are alive before antimony is given) and for the stool examination for the ova of blood flukes. For other helminthic ova in faeces the Willis method is advised, or Khalil's, of which latter it is said " Thus all the ova contained in the original 2 cc. of stools will have been concentrated in an area of about 1 cm. in diameter in a medium free from at least the grosser particles of faecal débris." [Those who advise this technique have elected to ignore persistently the abstractor's findings, not denied hitherto, that gravity floatation in an inverted funnel delivered on the average one-fiftieth of the eggs present in the faeces used.]

C. L.

i. Kostyleff (N. N.) & Blohina (Z. A.). Ueber die Verbreitung des Helminthenträgertumszwischen Landeinwohnern des Nowgorodschen Bezirks. [**Incidence of Helminths among the Rural Population of the Novgorod District.**]—*Milit.-Med. Ztschr.* Leningrad. 1930. Vol. 1. No. 3–4. pp. 45–53. With 5 text figs. [4 refs.] [In Russian.]

ii. Kuscheleff (W.). Zur Frage ueber den Einfluss des Helminthenträgertums auf allgemeinen Gesundheitszustand der Rotarmisten. [**Influence of Latent Helminthic Infections upon the Health of Red Army Soldiers.**]—*Ibid.* pp. 54–66. [21 refs.] [In Russian. German summary p. 67.]

iii. Sawitzky (N. N.). Zur Methodologie der Bandwürmervertreibung. [**Method of Expulsion of Tape Worms.**]—*Ibid.* pp. 68–69. [In Russian.]

i. The authors report the results of a helminthological examination of the population of a number of villages in the Novgorod district

(North-Western Russia). The examination was undertaken with the object of establishing the incidence of helminths in a typical rural population, and forms part of a scheme for a general helminthological survey throughout Russia. The total number of local peasants examined was 668, besides 32 temporary inhabitants considered separately. A modification of Fülleborn's method was employed: both the surface film, produced after mixing the faeces with a saturated solution of sodium chloride, and the deposit were examined. Apart from this 1–2 faeces-smears were examined in each case, while for the detection of Oxyuris eggs anal scrapings were made. It was found that 403, or about 60·3 per cent., of the peasants were infected. The incidence amongst the non-resident population was 40·5 per cent. The worms were distributed as follows in the two categories of population: *Ascaris lumbricoides* (362+7), *Trichuris trichiura* (12+4), *Enterobius vermicularis* (62+2), *Trichostrongylus* sp. (2+0), *Diphyllobothrium latum* (2+0), *Taenia solium* (4+0), *Hymenolepis diminuta* (2+0). There were 38 cases of mixed infections.

ii. The author has examined soldiers of the Red Army attending the clinic of the Military Academy of Medicine with the view to establishing the influence of latent helminthic infections upon their general health. Out of 100 soldiers 29 per cent. were found to be "carriers" of helminths, in the following proportions: *Trichuris* 17 per cent., *Ascaris* 13 per cent., *Taenia solium* 2 per cent., *Diphyllobothrium* 1 per cent., *Enterobius* 1 per cent. The incidence in peasants (39 per cent.) was higher than in town-dwellers (23 per cent.), while the distribution of the various forms also differed in the two groups: amongst the peasants 58 per cent. harboured *Ascaris*, 33 *Trichuris* and 25 other helminths, whilst amongst the town-dwellers 88 per cent. were infected with *Trichocephalus* and 12 per cent. with *Ascaris*. No special symptoms attributable to the helminths could be detected in the "carriers." All the soldiers examined were divided into three groups: 70 uninfected, 17 *Trichuris*-carriers, and 13 *Ascaris*-carriers. These were subjected to a thorough physical and clinical examination, according to Nadeshdin's standard method (*Deutsch. Zeitschr. ges. gerichtl. Medizin.* 1928, Vol. XI, p. 401).

The average constitutional and functional conditions were recorded for each group and compared, and observations were made on the activity of the lungs and the condition of the nervous system. It is concluded that while no specific symptoms could be attributed to the helminths, they have a certain effect upon the general well-being of the subject and upon the nervous system.

iii. The author describes a method of expulsion of tape-worms using Einhorn's duodenal catheter. The patient is given 30 gm. sodium sulphate in the afternoon and starved for the rest of the day. Next morning the bowels are emptied by an enema. The patient is allowed to swallow the catheter and placed on the right side. The penetration of the catheter into the duodenum takes place in about 1–2 hours, being indicated by the flow of an alkaline yellow fluid from the free end. The patient is then turned on to the back, a small glass funnel is attached to the end of the catheter and the following emulsion is poured into it: ethereal extract of male fern 5·0 gm., gum arabic mucilage 5·0 gm., sodium carbonate 0·5 gm., distilled water 50·0 cc. About 3/5–4/5 of this amount, equivalent to 3–4 gm. of male fern, is usually introduced. Immediately afterwards 50 cc. of warm 50 per cent. solution of sodium sulphate is poured in and the catheter extracted.

Expulsion takes place in about 1–2 hours. This method is said to be superior to all others in that all the toxic effects of the drug are avoided and the desirable effect is produced by half the usual dose.

C. A. Hoare.

Trofimowa (A.). Helminthokoprologische Untersuchung der Schüler ASSR der Wolgadeutschen. [**Helminth Investigations of Schools of Volga Germans.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1931. Vol. 10. No. 1. pp. 109–112. [In Russian. German summary p. 113.]

The German abstract shows that in two Russian schools the percentage of infected children varied from 26·4 to 56 and in three German ones from 9 to 24. The method of examination is unstated but enterobius averaged 16·6 per cent., trichuris 3·9 and ascaris 1·9. The tables in the Russian text show that trichostrongylus eggs were found in four of 325 Russian children and in none of 239 German children.

C. L.

Stepanow (N.). La faune helmintique des indigènes du Touïkménistane. [**Helminthic Fauna of the Natives of Turkmenistan.**]—*Arch. Sci. Biol.* 1931. Vol. 31. No. 1. pp. 9–14. [6 refs.] [In Russian. French summary pp. 15–16.] [Chem. Bact. Inst., Turkmenistan.]

By a technique unstated in the summary the native inhabitants of Turkestan were found infected to the following percentage extent: *Hymenolepis nana* 8·4, *Trichuris trichiura* 8·4, *Taenia solium* 7·8, ascaris 6·5, enterobius 3·2, *Fasciola hepatica* 2·5, *Diphyllobothrium latum* 1·7, "*Distomum lancetiforme*" [? *Dicrocoelium dendriticum*] 0·5, ankylostomes 1·19. Russians are less infected, as are the dwellers in Tadjikistan; "ouzbeks" are more so.

C. L.

Neuland-Dobrowa (M.). Arbeit der I. (86. Unionexpedition) Helminthologischen Expedition des Staatsinstituts für Mikrobiologie und Epidemiologie des Süd-Ostens RSFSR im Stalingrad'schen Bezirk. [**Helminth Investigation near Stalingrad.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1930. Vol. 9. No. 4. pp. 589–604. [In Russian. German summary.]

The parasites reported as present in scholars were: trichuris, enterobius, ascaris, trichostrongylus, *H. nana, D. latum,* taenia, *Dicrocoelium dendriticum* and *Fasciola hepatica.* The highest percentage of infection among grown persons, found by an unstated diagnostic method, was 56 in Erdgräber [? diggers]; among children it was 58 for Armenians and 54 for Tartars. The last harboured *H. nana* to 44 per cent., the highest percentage shown in the investigations. A sanitary campaign is advocated. 342 animals were examined also.

C. L.

Ishii (N.) & Tei Tok Wa. **Studies on the Frequency of Parasites and their Connection with Vegetables in Amoy, China.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1931. Aug. Vol. 30. No. 8 (317). [In Japanese. English summary pp. 61–62.] [Japanese Hosp., Amoy, China.]

Of 634 persons whose faeces were examined, presumably by smear, in Amoy, 423 or 66·72 per cent. were infected. Individual infection numbers were as follows: "Amoeba" 208, ascaris 160, trichuris 94, hookworm 17, enterobius 6, *T. saginata* 1, clonorchis 6.

C. L.

Keller (A. E.). **Field Studies of Human Intestinal Parasites in Tennessee.**—*Southern Med. Jl.* 1931. Apr. Vol. 24. No. 4. pp. 336–343. With 3 figs. & 1 graph. [10 refs.] [State Dept. of Public Health, & Dept. of Preventive Med. & Public Health, Vanderbilt Univ., Nashville, Tenn.]

Examinations were made on 25,192 persons living in rural areas " almost entirely unsanitated " and representing 2·1 per cent. of the rural population. The technique was that of Stoll and Hausheer. " By using this technique it has been possible to determine not only the incidence but also the intensity of the worm burden of the persons infected with the different helminths " [which implies for hookworms that by examining one two-hundredth of a gram the presence of a worm can be substantiated which lays about 40 eggs per gram of faeces]. Hookworm incidence by this method measured 7·4 per cent. as compared with 25·4 per cent. found by the Rockefeller Sanitary Commission in the same area about 20 years earlier by the use of the smear. It is held that the smear is probably less accurate than the Stoll Hausheer technique. For ascaris the percentage of infection found was 26·3 as against 21·3 by the Rockefeller Sanitary Commission, and for trichuris 7·8 as against 4·7, and for *Hymenolepis nana* 2·9 against 2·4. Seven cases of *H. diminuta* infestation have been found, while the eggs of *Enterobius vermicularis* were detected in 0·25 per cent. " The failure to find its eggs more frequently is undoubtedly because its habitat is usually the lower colon and the eggs, therefore, are not uniformly distributed in the stool specimens " [an explanation which scarely fits the facts].

C. L.

Barlow (C. H.). **A New Method for examining Urine for Helminth Eggs.**—*Amer. Jl. Hyg.* 1931. July. Vol. 14. No. 1. pp. 212–217. With 2 figs.

The method aims at enumeration of helminthic eggs in urine and the preservation by drying of the centrifugal deposit. The details, which have been followed with some difficulty, are fully set out. The aim is to obtain the whole morning urine, mix it, precipitate a known fraction, add to the precipitate a drop of aqueous solution of methylene blue, and spread the blued precipitate evenly and not too densely, within a grease proof pencilled enclosure on one or more slides. It may be examined at once, or dried and stored till needed. If the latter it may readily be transported, and before examination enough water is added to moisten it all without forming a meniscus. Drying is reported to roll *S. mansoni* eggs so that the spine becomes visible. Moistening may be repeated for a series of examinations at different times, eggs and cells filling out each time.

C. L.

Zschucke (Johannes). Eine Kammer für die mikroskopische Zählung von Helmintheneiern und -larven. [**A Chamber for the Microscopical Enumeration of Helminth Eggs and Larvae.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. June. Vol. 35. No. 6. pp. 357–363. With 1 text fig. [18 refs.]

The author describes a shallow cell measuring 25 by 15 and 2 mm. deep, its bottom marked by fine lines into squares 0·5 mm. wide,

and by heavy lines into others 5 mm. wide, each that is enclosing 100 of the smaller squares. He has found that this aid to accuracy increased his Stoll counts as 33·3 is to 24·3.

C. L.

GUILLINY (R.). Détermination du temps optimum dans la recherche des oeufs de parasites intestinaux par la méthode de la solution saline. [**The Best Time to examine for Helminthic Ova by the Floatation Method.**]—*Marseille-Méd.* 1931. Feb. 25. Vol. 68. No. 6. pp. 289–293. [1 ref.]

Guilliny has tested a modified Willis's technique for that duration of gravity floatation, in a saturated solution of salt, which gives the best results. He reaches the following comparative figures, thus confirming results already published :

	10 mins.	30 mins.	1 hour	3 hours	6 hours	14 hours
Ascaris ...	23	45	96	42	10	8
Trichuris ...	51	103	130	105	78	22
Ankylostome...	36	87	111	47	41	2

He compared his method against the smear in the same group of persons and found that the two techniques showed the following differing percentages of infection :

	Percentage after enrichment	Percentage after direct examination
Ankylostomes	100	73
Ascaris	77	72
Trichuris	86	47
Schistosoma mansoni	4·5	28
Enterobius...	3	1

[It will however be realized that the latter method of comparison will give figures varying with each varying weight of infection, seeing that in a series of heavy enough infections a smear will detect 100 per cent. of them, whereas in a series of light enough infections a smear will detect none.]

C. L.

BLASCHIN (A. N.). Beobachtungen der Eier von Parasitenwürmern auf einem dunkeln oder kontrastierenden Grund. [**Observations of Ova of Parasitic Worms on a Dark or Contrasting Ground.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. June. Vol. 35. No. 6. pp. 363–365. With 1 text fig. [Trop. Inst., Abkhasia, Georgia.]

The " Kofoid-Barber-Fülleborn " method for the detection of certain nematode eggs in faeces is evidently held to be the method of election in nearly all laboratories. Blaschin has not found it satisfactory because it does not collect all eggs. He advises that faeces

should be ground up with a wooden instrument in a flat-bottom glass cylinder with 20 times its volume of saturated salt solution, filled brimful with the same or with some glycerine, covered without inclusion of an air bubble, and examined. The cylinder, 45 mm. high and 20 mm. wide, is then placed on the microscope stage and viewed from above being lighted by a horizontal ray of light striking it at the surface level or just below this. No instructions are given as to allowing the vessel to stand for gravity to have its slow effect in floating eggs. It is apparently held that eggs float throughout the stages of embryonal development, since the method is advised as a means of watching this. It is advised also as a method of egg counting, though no control as to its efficacy is mentioned.

C. L.

Mandoul (A. H.). A propos de l'action de quelques helminthes sur l'évolution de la tuberculose. [**Action of Helminths on the Development of Tuberculosis.**]—*Ann. Parasit. Humaine et Comparée.* 1931. July 1. Vol. 9. No. 4. pp. 323–324. [5 refs.] [Parasit. Lab., Faculty of Med., Bordeaux.]

In connexion with Sorour's paper (this *Bulletin*, Vol. 28, p. 190) suggesting that bilharziasis is inimical to tuberculosis by reason of the induced eosinophilia, Mandoul draws attention to work by Jammes and himself (1904 to 1906) indicating that guineapigs treated with extract of taenia were resistant to tubercle. He states too that ankylostomiasis is inimical to tubercle infection and produces an intense eosinophilia. [The last statement cannot surely be upheld.]

C. L.

Walravens (P.) & Lombart (H.). Verminose urinaire. [**Urinary Verminosis.**]—*Ann. Soc. Belge de Méd. Trop.* 1931. June 31. Vol. 11. No. 2. pp. 205–207. With 1 text fig. [Bact. Lab., Elisabethville.]

From clot obtained by centrifuging the urine of a European suffering from sharp lumbar pain the authors isolated about 20 spindle-shaped bodies 91μ long by 31μ broad with transversely striated shell and containing debris but no sign of an embryo; and also a sheathed larvae 460μ long. It is suggested that, if these objects are eggs of *Dioctophyme renale*, their unusual shape might be explained by their having no embryo, though it is pointed out that the body described as an embryo is bigger than that of this parasite. Ten more examinations failed to discover the spindle bodies again, though an incomplete "larva" was found once. Precautions taken to prevent contamination of the vessel receiving urine are not mentioned. The urine continued to display red corpuscles and leucocytes.

C. L.

Zeitschrift für Fleisch- und Milchhygiene. 1931. Aug. 15. Vol. 41. No. 22. pp 487–488. With 1 text fig.—Zum Auftreten der chinesischen Wollhandkrabbe in Deutschland. [**Occurrence of Chinese Crab, Eriocheir, in Germany.**]

The crab *Eriocheir sinensis* was first found in the lower Elbe about 8 years ago. How it came from the Far East is unknown, but it has thriven and spread to a distance of 40 km. south of the port.

C. L.

Garin (C. N.), Rousset (J.) & Gonthier (B.). Un nouvel anthelminthique : le tétrachloréthylène. [**Tetrachlorethylene, a New Anthelmintic.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1931. June 15. Year 47. 3rd Ser. No. 20. pp. 1003–1005.

The authors have given 371 treatments in doses which, to persons not notably weak, were mostly of 3 gm. on the first day, 4 on the second and 5 on the third, given 1 gm. at a time in capsule at hourly intervals, patients being confined to bed or at least to their rooms, alcohol being forbidden and milk encouraged, and urine being tested daily. Three hours after the last capsule, a dose of 40 gm. of sulphate of soda was given. All stools were washed for worms, and it is stated that there was " numération " of eggs, by which is apparently meant examination of the stools presumably by smear a month after treatment. By these tests 91·5 per cent. of hookworm carriers were disinfested, 77·4 per cent. in one treatment. There were also expelled *Taenia saginata* in 2 cases, ascaris in 13, and trichuris in 36. No estimate of the numbers of cases originally infected with these additional worm species is attempted. The urine was tested daily 3 or 4 hours after ingestion of the drug. No albumin was found, but an orange red colour showed up with nitric acid. No ill effects were encountered beyond a feeling of drunkenness and giddiness immediately after taking the drug. [Kendrick's quite anxious experience after 3 gm. will not be forgotten, this *Bulletin*, Vol. 27, p. 420.]

C. L.

Hack (Philip). **A Case of Delayed Toxic Reaction following Antimony Therapy.**—*Jl. Med. Assoc. South Africa.* 1931. Jan. 10. Vol. 5. No. 1. p. 22.

For urinary bilharziasis tartar emetic to grains xx (gm. 1·3) was given between 18th July and 3rd August to a European boy of 15. On 22nd August he became pyrexial with cough, right hypochondriac tenderness and resistance, epistaxis, delirium, the temperature reaching 106° F., a sallow complexion, impaired air entry at right base, and albuminuria. The symptoms cleared up after an injection of sodium nucleate. It is particularly pointed out that this reaction occurred after the use of the potassium salt.

C. L.

Akil-Mouktar. Le tétrachlorure de carbone, remède efficace contre les oxyures et les taenias. [**Carbon Tetrachloride in the Treatment of Oxyuriasis and Taeniasis.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1931. Feb. 9. Year 47. 3rd Ser. No. 4. pp. 183–184.

The adult dosage was 3 to 4 cc. It is advised for thread worms on unstated grounds, was found poor for ascaris, and is said to have been completely successful in 28 of 30 cases of *Taenia saginata*.

C. L.

Pouchet. Utilisation des pyréthrines en médecine humaine, vétérinaire et en hygiène. [**Employment of Pyrethrum in Animal and Human Medicine.**]—*Bull. Acad. Méd.* 1931. July 7. 95th Year. 3rd Ser. Vol. 106. No. 26. pp. 14–16.

In effect the claim is to the discovery of the perfect parasiticide in the active principles of *Chrysanthemum cinerariaefolium*, completely non-toxic and non-irritant to the host, while ascaris, trichuris, hookworms, thread worms and tape worms are eliminated by treatment on one, or perhaps on several days. Kennels, farms and stud farms can be cleared of parasites

or, as a second thought seems to suggest, at least almost cleared. An archaeological expedition on the Euphrates was kept clear of trichuris by monthly dosage. The dose one horse got was 2 gm. of pyrethrine in the oil which the plant apparently gives. Intratracheal injections are advised for the verminous bronchitis of cattle. Fleas, lice, ticks and bugs cannot stand a dilution of 1 in 200,000, while any dwelling or ship is cleared of insect vermin by a spray of one in a quarter of a million. Is it cruel to ask for a scrap of controlled evidence ?

C. L.

Kochmann (M.). Chlorcarvacrol als Anthelmenticum (Carvasept) (nebst Bemerkungen über die Wirkung des Carvacrol, Thymol und Santonin). [**Chlorcarvacrol as Anthelmintic.**]—*Arch. f. Experim. Path. u. Pharmakol.* 1931. Aug. 1. Vol. 161. No. 2. pp. 196–205. With 3 text figs. [8 refs.] [Pharmacol. Inst., Combined Univ., Halle-Wittenberg.]

Chlorcarvacrol is one of the thymol series and indeed has a thymol-like smell. It is a crystalline body, soluble in about 5,000 parts of water, readily soluble in oil and in alcohol, even diluted alcohol. Its effect on earthworms has been tested ; the uncut worm is paralysed in a dilution of 1 in 150,000, killed in a more concentrated solution ; strips of worm show rhythemic contraction, spasm or paralysis according to the strength of the drug. The leech required greater concentrations to obtain the same effect. Given to dogs in oily solution it removed tapeworms in one or in two doses of 0·1 gm. each, apparently 0·03 to 0·04 gm. was held an equally effective dose, while ten times that dose had no ill effect on medium sized dogs. The toxicity of chlorcarvacrol is less than that of carvacrol, and to certain animals than thymol. To earthworms it is more lethal than santonin.

C. L.

Advier. Sur plusieurs cas d'helminthiase résistant à la thérapeutique. [**Cases of Helminthiasis Refractory to Treatment.**]—*Marseille Méd.* 1931. Feb. 25. Vol. 68. No. 6. pp. 283–287.

Six cases are described in which helminthic infections continued to be detected after vigorous treatment. 1. Hookworm, trichuris, *S. mansoni*, *H. nana*, treated with thymol, male fern, pelleterine, emetine. 2. Hookworm, trichuris, *S. mansoni* treated with thymol and emetine. 3. The same three worms and also ascaris treated with santonin, thymol, and emetine. 4. The same three worms treated with thymol and emetine. 5. *S. haematobium* treated with emetine. 6. Vesical and intestinal schistosomiasis treated with emetine. In discussion Joyeux pointed out that the question of possible reinfection remained unanswered.

C. L.

Kemp (Alexander H.). **Intestinal Parasites : a Suggestion in the Method of Treatment.**—*Jl. Amer. Med. Assoc.* 1931. June 6. Vol. 96. No. 23. pp. 1948–1949.

It is suggested, evidently as a new idea, that the preanthelmintic purge may be omitted without risk to the host and without protection to the worm. Some instances are given in which worms were passed when the drug was given without preparation of the patient. In 3,000 cases so treated there were none of the ill effects which seem to have been expected.

C. L.

Meidinger (F. E.). La bilharziose dans la région de Bou-Denib. [**Schistosomiasis in the Region of Bou-Denib, East Morocco.**]—*Arch. Méd. et Pharm. Milit.* 1931. Mar. Vol. 94. No. 3. pp. 427–462. With 3 text figs. & 3 maps (1 folding). [1 ref.]

The discovery of this new focus of endemicity for vesical schistosomiasis in Morocco is the occasion for a general paper in which a map of the eastern hemisphere shows *S. haematobium* as affecting among other places the whole of Spain and Portugal, the whole of Australia and the whole of the peninsular portion of India. In Bou-Denib 35 per cent. of persons are held to be infected and 80 per cent. of some military units. Treatment with emetine was found useless, that with tartar emetic and fouadin to give good results but to be followed by relapse.

C. L.

Bousquet (Alcide). La bilharziose dans le Nefzaoua. Etude sommaire. [**Schistosomiasis in the Nefzaoua.**]—*Arch. Inst. Pasteur de Tunis.* 1930. Dec. Vol. 19. No. 4. pp. 438–450. With 5 text figs. & 1 map. [9 refs.]

An essential factor in the local epidemiology is the number of springs, one village of 109 inhabitants being surrounded by seven. At the same time the distribution of "pisseurs de sang" is most irregular. The snail implicated is *Bullinus contortus—B. dybowski* and planorbis not being found. *S. haematobium* alone is present with an occasional intestinal habitat. Of specific remedies Bousquet prefers emetine to tartar emetic, antimosan or fouadin; but for ambulatory causes methylene blue. Moreover the people, it is noted, actually come back and ask for more of this last. Of prophylactic measures against snails, chemical ones are held dangerous, and mechanical ones advised; though the complete and periodic drying up of irrigation channels may, it is realized, be very difficult to secure.

C. L.

Gopsill (W. L.). **Schistosomiasis in Nyasaland, and its Treatment by Means of Fouadin.**—*Jl. Med. Assoc. South Africa.* 1931. Apr. 11. Vol. 5. No. 7. pp. 222–223.

This paper deals with the routine examination of the urine of 500 and of the faeces, presumably by smear, of 1,000 persons. Of the urines 80 per cent. showed eggs of *S. haematobium* and none those of *S. mansoni*, while none of the infected persons complained of any symptoms except ten with vesical calculi. Of the faeces "30 per cent. were positive to ankylostomiasis and *Schistosoma mansoni*" and all with the latter infection gave a history of a dysenteric stage. Details of treatment are not easy to follow, but apparently cure was more rapid with six intramuscular fouadin injections, on alternate days rising from 1 cc. to 4 cc., than with tartar emetic or emetine. "Routine examination of the faeces of forty different pigs showed a positive result to the ova of *Schistosoma mansoni* in 32 cases."

C. L.

STAUDT (H.). La schistosomiase à l'école professionnelle de la Kafubu (Katanga). [**Schistosomiasis at a School in the Katanga Province.**] —*Ann. Soc. Belge de Méd. Trop.* 1931. Mar. 31. Vol. 11. No. 1. pp. 67–73.

Of 175 [not 171 as stated once in the text] school children, between the ages of 10 and 16, examined for schistosome eggs, the eggs of *S. haematobium* were found in the urine in 51 (29·14 per cent.), two showing also the eggs of *S. mansoni*, while 16 (9·14 per cent.) showed the eggs of the latter in the faeces. The general health of the infected was held to be excellent and symptoms to be less severe than in Egypt; albumin was a valuable sign of infection; macroscopic evidence of blood was present in 10. In treatment, stibenyl and neostibosan appeared useless, antimosan gave good results in the case in which it was tried, stibyal was effective, but produced ready vomiting, tartar emetic by mouth in doses which could be tolerated had no effect in 24 days though intravenously the potassium salt was effective, emetine was expensive and proved less effective than tartar emetic. A mixed treatment of three injections of each was excellent, 4, 6 and 8 cgm. of emetine followed by 6, 8 and 8 cgm. of tartar emetic.

C. L.

CAWSTON (F. G.). **Pathological Conditions associated with Schistosomiasis in South Africa.**— *Jl. Trop. Med. & Hyg.* 1931. Feb. 16. Vol. 34. No. 4. pp. 55–57. [7 refs.]

"The hepatic changes caused by the development of schistosomes before they migrate into the mesenteric veins must receive due consideration in any efforts to cure bilharzia disease.

"Chronic appendicitis due to bilharzia ova draws attention to the need for a more careful examination of the urine and for the detection of other parasites which might complicate surgical interference. Operation or treatment of bacterial conditions must not be attempted without the destruction of these large blood parasites, where they are shown to exist.

"Every endeavour should be made to ascertain the amount of bilharzia infection amongst South African stock and to prevent human beings from being exposed to possible attack.

"The attempt to obtain a too rapid cure of bilharzia disease is likely to result in the formation of septic foci by the sudden removal of these blood-flukes from their usual situation in the abdominal veins."

C. L.

HASHIM (M.). **Pathological Lesions of the Gall-Bladder, associated with Ulcerations and Bilharziasis of the Intestine.**— *Jl. Egyptian Med. Assoc.* 1931. Sept. Vol. 14. No. 9. pp. 461–472. With 7 text figs.

Of 280 autopsies performed at Kasr el Aini Hospital during the last two years, 43 showed intestinal lesions due to schistosomes, and six of the 43 showed bilharzial lesions of the gall bladder, infection having been proved during life by finding ova in faeces or urine or both. Only two persons made definite complaint of pain in the gall bladder region; one proved to have also an amoebic abscess of the liver, the other died of acute cholecystitis and hepatic atrophy. All six showed ova of *S. mansoni*, two also those of *S. haematobium*, and

in all six cases the lesions comprised all the coats of the viscus. It may be added that of the 280 cases, 12 were of amoebic dysentery, 4 having also hepatic abscess and one an amoebic infection of the mucosa of the gall bladder.

C. L.

Assali (J.). A propos d'un cas de tumeur bilharzienne. [**A Schistosomal Tumour.**]—*Bull. Soc. Path. Exot.* 1931. June 10. Vol. 24. No. 6. pp. 499–501. [Central Native Hosp., Dakar.]

A left scrotal tumour of three years' duration, reaching to mid-thigh, consisted partly of hernia, partly of solid matter apart from the testis, and partly evidently of bladder since, by squeezing it after micturition was finished, more urine could be passed. The skin was ridged with veins as wide as the little finger. A difficult bloody operation removed tumour with testis and opened the bladder which was sewn up, but subsequent leakage of urine through a fistula ceased only on tying a catheter into the urethra. The tumour weighed 1 kgm. and consisted of an aggregation of lumps varying from the size of a billiard ball to that of a mandarine orange. It creaked on cutting and consisted of concentric fibrous tissue round calcified schistosome eggs with terminal spines.

C. L.

Stewart (Quintin). **A Bilharzial Tumour of the Appendix.**—*West African Med. Jl.* Lagos. 1930. July. Vol. 4. No. 1. p. 3. With 3 figs. on 2 plates. [4 refs.]

The appendix, removed at herniotomy, was 3 cm. in diameter distally, tapering to close to its base ; on section it was hard, white, homogeneous, with schistosome ova throughout it and giant cells. In sections the eggs appeared to be terminal spined.

C. L.

Cawston (F. G.). **A Case of Bilharzia Disease complicated by Jaundice.**—*Jl. Trop. Med. & Hyg.* 1931. Oct. 1. Vol. 34. No. 19. p. 317. [3 refs.]

In spite of marked jaundice, a girl of 18 with ova of *S. haematobium* in bile-stained urine was given intramuscularly during three weeks 18¼ cc. of fouadin in usual doses of 2¼ cc., the first two doses having been of 1 cc. and 2 cc. At the end of treatment degenerating ova had completely disappeared, and in the next few weeks she gained 20 lbs. Gopsill is reported as advising half the recommended doses, as being safe and more efficacious than full ones.

C. L.

Hassan (Aly). **A Comparison of the Relative Killing Power of Some Colloidal Metals on the Schistosome Cercariae of the Human Type.**—*Jl. Egyptian Med. Assoc.* 1931. Aug. Vol. 14. No. 8. pp. 405–414.

Fresh schistosome cercariae were killed in one hour by colloidal metals in the following dilutions : calcium 100,000, gold 80,000, antimony 40,000, arsenic 20,000, copper and iodine 8,000, bismuth, iron, silver, manganese and mercury 4,000. Calcium chloride needs a strength of 1 in 20.

C. L.

Girges (Rameses). **Pathology of Schistosomiasis Haematobium.**—*Jl. Trop. Med. & Hyg.* 1931. Mar. 2. Vol. 34. No. 5. pp. 65–75. With 6 text figs. [4 refs.]

A general review of the conditions found.

C. L.

Mattei (R. Marina). Su alcuni casi di Schistosomiasi vescicale. [**Urinary Schistosomiasis.**]—*Ann. di Med. Nav. e Colon.* 1931. July-Aug. Year 37. Vol. 2. No. 1–2. pp. 395–407. With 1 text fig. [5 refs.]

The author describes 4 cases of infestation by *S. haematobium* in the district of Scebeli, Italian Somaliland.

H. H. S.

Archibald (R. G.) & Marshall (A.). **A Study of Three Non-Furcocercous Cercariae obtained from *Bullinus contortus* in the Sudan.**—*Parasitology.* 1931. July. Vol. 23. No. 3. pp. 271–281. With 6 figs. [3 refs.]

" 1. A technique is given for the detailed study of living cercariae in which reference is made to the value of human or horse blood serum as a mounting medium.

" 2. As a fixative agent for cercariae prior to staining the use of hot lactophenol solution is recommended.

" 3. A description is given of three non-furcocercous cercariae obtained from *Bullinus contortus* in the Sudan."

C. L.

Stiven (H. E. S.). **Geographical Distribution of Cases of Egyptian Splenomegaly.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. June 30. Vol. 25. No. 1. pp. 77–78. With 1 map.

Deaths after splenectomy at the Port Said hospital for the last 3 years have been 10, 14·3 and 23·3 per cent. of all cases operated on, the increase being due to " the tendency to operate upon truly desperate cases as so often a remarkable cure results even in those with ascites." The paper contains a map showing distribution of the cases and Stiven hopes that future ones will bear out his theory that the condition is caused by *S. mansoni* and is found chiefly at the tail end of the canals in the Delta.

C. L.

Girges (Rameses). **The Causation of Egyptian Splenomegaly by Male *Schistosoma mansoni* alone.**—*Jl. Egyptian Med. Assoc.* 1931. May. Vol. 14. No. 5. pp. 282–304. [35 refs.]

In brief the line of proof put forward is that the incidences of Egyptian splenomegaly and infection by *S. mansoni* are the same in area, age, sex and occupation, that the former is preceded by symptoms of the latter, that there is analogy with infection by *S. japonicum*, that the only parasites recovered from these cases have been male schistosomes, that the cases improve under tartar emetic, show a marked complement fixation reaction so far as examination has gone, and that the liver and spleen show large quantities of haematoidin granules. There is free quotation of papers already abstracted in these pages.

C. L.

TALIAFERRO (William H.) & TALIAFERRO (Lucy G.). **Skin Reactions in Persons infected with** *Schistosoma mansoni.*—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. Sept. Vol. 7. No. 1. pp. 23–35. [9 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan, & Dept. of Hyg. & Bact., Univ., Chicago.]

Since 16 per cent. of persons, whether infected or not with *Schistosoma mansoni*, react to extracts of uninfected snails' livers, that is of the posterior half of *Planorbis guadeloupensis*, control is necessary in every case.

" The intradermal injection of 0·025 cc. of a 0·5 per cent. saline extract of dried 'livers' of snails infected with *S. mansoni* elicited immediate skin reactions in the majority of persons infected with *S. mansoni*. Using as the criterion for positiveness the possession of pseudopods by the urticarial wheal and a negative reaction to some control extract, the following results were obtained in testing 120 persons: In tests on 53 persons with a known present or past infection, 40 were positive, 6 were negative and 7 were eliminated because of positive controls. In tests on 21 possibly infected persons from a highly infected endemic area, 8 were positive, 8 negative and 5 were eliminated because of positive controls. In tests on 46 uninfected persons, none were positive, 42 were negative and 4 had to be eliminated because of positive controls. Almost identical results were obtained where a reaction was considered positive if it exhibited a wheal of 10 mm. or more, or a wheal with pseudopods no matter its size, provided a control injection with some other extract was negative.....

" Positive immediate intradermal reactions were as common in persons with a past infection as with a present one.

" In 2 out of 4 cases, serums from persons giving a positive immediate reaction conferred a local passive reactivity on non-reactors.

" The serum from a reactor (Prausnitz-Küstner antibody) was neutralized when mixed with schistosomal extract (antigen). On the other hand, the schistosome extract was not neutralized when mixed with the serum from a reactor, but the series of dilutions were not sufficiently exhaustive to be conclusive.

" Well marked delayed intradermal reactions were rare and occurred in 5 of 50 persons with past or present infection, in 4 of 20 possibly infected persons from endemic areas, and in none of 46 uninfected persons. In all cases they occurred in persons who gave a positive immediate reaction."

The number of persons giving adequate data was 120. Preliminary scratch tests were made in every case but as none showed a marked reaction, all received the intradermal injection. Whether positive skin reactions to helminth extracts are " non-specific " and due to infections with other worms or are evidence of earlier infection is at present left open.

C. L.

MANDRY (O. Costa). **Human Infestation with** *Fasciola hepatica.* **Report of a Case occurring in Porto Rico.**—*Bol. Asoc. Med. de Puerto Rico.* 1931. May. Vol. 23. No. 188. pp. 186–192. [14 refs.]

In over 50,000 faecal examinations by smear and by an unspecified floatation technique eggs of *Fasciola hepatica* have been twice identified. One patient was a Venezuelan who had lived in Porto Rico for 8 years; the other had never left the island. Abdominal pain and

diarrhoea without hepatic enlargement were present in one case. The other was discovered on routine examination. Gentian violet is being tried.

C. L.

COUTELEN (F.) & AUDAIN (L.). Un cas de distomatose hépatique humaine à *Fasciola hepatica* dans la région parisienne. [**Case of** *Fasciola hepatica* **Infestation near Paris.**]—*Rev. Méd. et Hyg. Trop.* 1931. Mar.–Apr. Vol. 23. No. 2. pp. 86–90. [3 refs.] [Parasit. Lab., Faculty of Med., Paris.]

For more than two years a man living at Rueil had had recurrent attacks of diarrhoea with bilious vomiting ; yet he got down 3 good meals a day. Microscopic examination of the stools showed eggs of *Fasciola hepatica.* The worms were not incommoded by male fern, thymol or stovarsol.

C. L.

TOULLEC (F.) & RIOU (M.). Le tubage duodénal dans les affections à *Clonorchis sinensis.* [**The Duodenal Sound in** *C. sinensis* **Infestations.**]—*Bull. Soc. Path. Exot.* 1931. Apr. 15. Vol. 24. No. 4. pp. 286–287. [Colonial School of Health, Marseilles.]

The use of the sound is diagnostic. It is stated that in clonorchis infection the sound has displayed great abundance of eggs when none have been detected on 6 or 7 faecal slides.

C. L.

YOSHIDA (Inataro). Experimentelle Untersuchung ueber die harnsäurespaltende Wirkung des Leber bei Kaninchenclonorchiasis. (I. & II. Mitteilungen.) [**On the Action of the Liver of Clonorchis-infested Rabbits in splitting Uric Acid.**]—*Okayama-Igakkai-Zasshi* (*Zent. d. Okayama med. Gesellsch.*). 1931. Mar. Vol. 43. No. 3. pp. 566–573. [30 refs.] [In Japanese. German summary p. 574.] ; 575–579. [4 refs.] [In Japanese. German summary p. 580.] [Inst. of Forsensic Med., Med. Univ., Okayama.]

i. The amount of uric acid converted to allantoin by liver pulp in given conditions is much less when the liver comes from a rabbit infected with clonorchis than when the rabbit is normal. Experiments to determine the actual cause of this restriction led to no result.

ii. The infected liver contains five times as much sulphate as the sound one.

C. L.

YOUNG (Shutsu). **The Changes in the Haematopoietic Organs and the Blood Picture in the Experimental Liver-Distomiasis.**—*Japanese Jl. Exper. Med.* 1931. Feb. 20. Vol. 9. No. 1. pp. 47–61. With 7 charts. [15 refs.]

Rabbits were used. If infestation was heavy the spleen became enlarged from passive congestion due to hepatic sclerosis ; late and slight splenic sclerosis might cause some shrinkage. In the marrow heavy infection caused temporary increase in the myeloid series and megakaryocytes, little in erythrocytes. Lymphocytes appeared unaltered. The liver showed marked eosinophilia, and at first many lymphocytes but later plasma cells. In the blood leucocytosis was present only if infection were heavy, there was a maximum eosinophilia of 10·3, no striking change in red corpuscles or platelets.

C. L.

Guillon. A propos du traitement des distomatoses hépatiques. [**Treatment for Hepatic Fluke Infestations.**]—*Ann. de Méd. et de Pharm. Colon.* 1931. Apr.–May–June. Vol. 29. No. 2. pp. 332–336. [9 refs.]

By analogy from veterinary medicine male fern with castor oil, with castor oil and calomel, or with calomel only is advised for flukes in biliary passages of man.

C. L.

Hino (I.). Nachtrag zu den Fällen von Knotenbildung durch Distoma pulmonale. [**Nodule Formation by** *Paragonimus westermanii.*]—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1931. Apr. Vol. 30. No. 4 (313). [In Japanese. German summary p. 32.] [Med. School, Taihoku, Formosa.]

Five extra-pulmonary nodules containing *Paragonimus westermanii* have been discovered fortuitously when operating for some other condition. Three were in the great omentum and two in a hernial sac. They may reach the size of a walnut.

C. L.

Ying (Y. Y.). **Paragonimus Infestation. A Report of Two Cases.**—*Nat. Med. Jl. China.* 1930. Oct. Vol. 16. No. 5. pp. 638–642. With 1 plate. [Red Cross General Hosp., Shanghai.]

Two cases with the usual chest symptoms and the paragonimus eggs in sputum and faeces are reported from Shaohsing, a new locality. In spite of treatment with sodium antimony tartrate, emetine, and gentian violet the cases went downhill and were removed from hospital.

C. L.

Choy (Paul D.) & Ludlow (A. I.). *Paragonimus westermanii.* **Encysted in the Sac of Inguinal Hernia.**—*China Med. Jl.* 1931. June. Vol. 45. No. 6. pp. 556–559. With 1 text fig. [5 refs.]

Their previous report (this *Bulletin*, Vol. 28, p. 754) on an odd habitat of this parasite concerned the finding of eggs in the abdominal wall in Korea. This paper describes two cases where the omental contents of inguinal herniae were implicated, eggs being found in the walls of cysts in one, and paired adults in a cyst in another. In the latter case eggs were present in the sputum.

C. L.

Galli-Valerio (B.) & Bornand (M.). La distomatose à *Dicrocoelium lanceolatum* Rud. chez l'homme. [*D. dendriticum* **Infestation in Man.**]—*Schweiz. Med. Woch.* 1931. June 27. No. 26. pp. 614–615. [16 refs.] [Inst. of Hyg. & Parasit., Univ., Lausanne.]

After a review of the literature the case is described of a girl with anaemia, haemoglobin 40 per cent., a few eggs of trichuris and a number of those of *D. dendriticum*. Treatment by thymol gm. 0·5 three times a day for 5 days, injections of solarsone and of milk were followed by disappearance of all helminthic eggs and an improvement of haemoglobin to 80 per cent. in 3 months. The injection doses are not stated.

C. L.

Cameron (Thomas W. M.). **Experimental Infection of Sheep with *Dicrocoelium dendriticum*.**—*Jl. Helminthology.* 1931. Feb. Vol. 9. No. 1. pp. 41–44. [2 refs.]

Eggs of *D. dendriticum* were fed to the land snails *Helicella itala*. Cercariae developed in some, apparently identical with *Cercaria vitrina*. When fed to sheep with a clean history *D. dendriticum* developed.

C. L.

Scriabine (K. I.), Podyapolskaya (W. P.) & Schoulz (G. S.). [**Human and Animal Metagonimiasis in the Far East of U.S.S.R.**]—*Trop. Med. & Vet.* Moscow. 1930. Vol. 8. No. 6–7. pp. 16–25. With 3 text figs. [In Russian.]

In 1928 a helminthological expedition was sent to the Far-Eastern extremity of Siberia (including the Amur and Maritime provinces) to investigate the helminthic infections among the local native tribes. It is merely stated that diagnosis was based on the finding of ova in the faeces. The total number of cases examined was 1,172, 59·2 per cent. of which were found to be infected. The incidence of trematodes was especially high and among these *Metagonimus yokogawai* Katsurada, 1913, occurred in 13·5 per cent. of the cases. This is the first record of this parasite in man in the territory of U.S.S.R. It was also found in local cats, dogs and foxes. The greater part of this paper is devoted to a description of the morphology and biology of *M. yokogawai*, based on the material collected, together with an account of the clinical, therapeutic and prophylactic aspects of metagonimiasis.

C. A. Hoare.

Brumpt (E.). Prurit et dermatites produits chez les nageurs par des cercaires de mollusques d'eau douce. [**Pruritus and Dermatitis in Swimmers produced by Molluscan Cercariae.**]—*C. R. Acad. Sci.* 1931. July 27. Vol. 193. No. 4. pp. 253–255.

Brumpt reviews the literature on the cercariae of water snails and bathing rashes (see this *Bulletin*, Vol. 27, pp. 960, 961) and describes an experiment in which, after placing 150 *Cercaria ocellata* from *Limnaea stagnalis* in contact with his skin for 10 minutes, 149 disappeared into it with pricking and redness, spots 1 mm. in diameter becoming papular in 16 hours, reaching 2 mm. in size in 24 hours with a purpuric centre, and not beginning to retrogress for 5 days. A newborn mouse had no attraction for them, nor had man for certain other cercariae.

C. L.

Brumpt (E.). *Cercaria ocellata*, déterminant la dermatite des nageurs, provient d'une bilharzie des canards. [**Swimmer's Dermatitis caused by *C. ocellata* from Ducks.**]—*C. R. Acad. Sci.* 1931. Oct. 12. Vol. 193. No. 15. pp. 612–614. With 12 text figs.

By setting 4 ducks in a vessel containing *Cercaria ocellata* (this *Bulletin*, Vol. 27, pp. 960, 961) Brumpt has recovered from the

organs of all of them eggs which are identified as those of *Bilharziella polonica*, and which resemble those of *B. yokogawa*. Some fragments of adult worms were collected from portal veins. Eight controls were negative.

C. L.

STUNKARD (H. W.). **An Analysis of the Methods used in the Study of Larval Trematodes.**—*Parasitology*. 1930. Mar. 24. Vol. 22. No. 2. pp. 268–273. [15 refs.] [Biol. Dept., Univ., New York.]

"The advantages and difficulties of various methods employed in the study of larval trematodes are discussed. The desirability of using living specimens rather than fixed material and of studying mature, normally emerged cercariae rather than those obtained by crushing the host is noted. Intra-vitam staining with neutral red is recommended to demonstrate the form and reaction of the secretory granules in gland cells. Knowledge of the details of the excretory system is of major importance in both theoretical and experimental work."

C. L.

MAGATH (Thomas B.) & ESSEX (Hiram E.). **Concerning the Distribution of *Diphyllobothrium latum* in North America.**—*Jl. Preventive Med.* 1931. July. Vol. 5. No. 4. pp. 227–242. With 1 text fig. [29 refs.] [Mayo Clinic & Mayo Foundation, Rochester, Minnesota.]

A wide examination of Minnesota waters shows that the Mississippi watershed is free from this infection, while certain lakes draining into Lake Superior, and into the Canadian lakes and so into Hudson Bay, are affected. The arthropod hosts infected are *Dioptomus oregonensis*, *D. sicilis* and *D. siciloides*, the two last being new, while the fish found infected during the authors' 5 years investigations have been *Esox lucius*, *Stizostedion vitreum*, and *Perca flavescens*. While accepting the possibility that dogs and other animals may play a small part in spreading infection, the authors have demonstrated* that while 80 per cent. of eggs from man develop active coracidia, only 1·5 per cent. of eggs from dogs do so. Man must then, they conclude, be the essential reservoir of infection. Since coracidia live only 12 hours even in sheltered laboratory conditions they are unlikely to diffuse infection; while a normal period of development of at least two weeks in Dioptomus suggests that, if these animals migrate in nature, infection may be so carried. As regards eggs they will not develop at 4° C., and this is the temperature at the bottom of the Great Lakes at all times. Lake Winnipeg is, however, in a state of continual turnover and the temperature is at most times suitable for the larval development. It is the most heavily infected water, particularly at its southern end. Control of infection is believed to be possible if the public will realize the issue. Measures should include the treatment of all sewage by some killing solution, the eating or tasting of no fish unless properly cooked, the freezing of fish imported from Canada, since plerocercoids are killed by a temperature of −9° C. maintained for 48 hours, notification and disinfestation of all human cases, stool examinations of all Baltic immigrants, and the stopping of feeding to dogs of raw fish species known to harbour the plerocercoids.

C. L.

* Evidence in the press.

Pilot (I.) & Levin (I. M.). **Native Infestation with *Diphyllobothrium latum* (Fish Tapeworm). With a Report of 5 Cases in Children.**—*Amer. Jl. Med. Sci.* 1931. May. Vol. 181. No. 5. pp. 710–714. [10 refs.] [Med. College, Univ. of Illinois, Chicago.]

Five fresh cases of autochthonous infection are noted, all in Jewish children, three as usual obtained from sampling "gefüllte" fish and two probably from eating fish improperly cooked.

C. L.

Mills (Edward S.). **Anaemia from *Dibothriocephalus latus*.**—*Canadian Med. Assoc. Jl.* 1931. July. Vol. 25. No. 1. pp. 75–77.

A Finn who had arrived in Canada 3 years earlier, and lived in Quebec since, gave a history of pallor of 6 or 7 weeks' duration. Haemoglobin 22, red corpuscles 910,000, blood simulating pernicious anaemia in practically every respect—high colour index, "leucocytes" reduced at the expense of the polymorphs, platelets below normal, diameter of red cells $9{\cdot}9\mu$, plasma bilirubin elevated. There was also achlorhydria. In two and a half months after expulsion of the tapeworm his haemoglobin was 85, his red corpuscles 5,000,000, and gastric hydrochloric acid was normal, and this "without recourse to liver or other similarly acting substances."

C. L.

Becker (Gösta). Ueber die Behandlung der Bothriozephalusanämie mit Leber und Leberpräparaten und mit Magenpräparat. [**Treatment of Diphyllobothrium Anaemia with Liver and Stomach Preparations.**]—*Acta Med. Scandinavica.* 1931. Vol. 75. No. 3–4. pp. 227–240. [18 refs.] [2nd Med. Clinic, Univ., Helsingfors.]

The material consists of 19 cases of anaemia of pernicious type associated with diphyllobothrium infection and treated with liver, liver extract, or stomach. In 18 cases the worms were left, in one expelled. In general, anaemia and reticulocyte reaction disappeared even in the still parasitized; but in two there was no response and in one but little. Two cases relapsed. Liver was more effective than stomach.

C. L.

i. Kobayashi (Hidekazu). **Studies on the Development of *Diphyllobothrium mansoni* Cobbold, 1882 (Joyeux, 1927). (Fifth Report.) On the First Intermediate Host, and Development in the First Intermediate Host.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1931. Mar. Vol. 30. No. 3 (312). pp. 286–310. With 3 charts in text & 19 figs. on 1 plate. [In Japanese. English summary pp. 24–27.]

ii. ——. **(Sixth Report). Development in the Second Intermediate Host and Plerocercoid in Natural Infection of Frogs and Musk-Rat (*Crocidura murina*).**—*Ibid.* Apr. No. 4 (313). pp. 363–380. With 3 text figs. [48 refs.] [In Japanese. English summary pp. 29–30.] [Govt. Med. College of Formosa, Taihoku.]

i. Only in cyclops species did the onchosphere develop. The susceptibility of the nine local species is described in terms of the numbers which reached the body cavity and grew to maturity in males and females. To all tests *C. leuckarti* was the best host, and in all cyclops species males were more readily infected than females.

Penetration and development in cyclops are described, the changes confirming established observations.

ii. Roughly speaking the plerocercoid grows twice as rapidly in the warm-blooded rat or mouse as in the cold-blooded frog, reaching 70–170 mm. in length in 35 days in the former and 16–37 in the latter. The percentage of natural infection of frogs in and about Taihoku is 4 in early spring, 59·6 in June to September, and 67·11 in October and November; while in the musk rat there are [? corresponding] seasonal differences of 10 to 19·5. In the frog most plerocercoids are in the femoral muscles, in the rodents in the adipose tissue of the neck and interscapular region. The local percentage infection rate with the strobile is 42·3 for cats and 10·71 for dogs.

C. L.

Storti (Edoardo). Anemia sperimentale da Botriocefalo. [**Experimental Diphyllobothrium Anaemia.**]—*Haematologica.* I. Arch. 1931. Vol. 12. No. 3. pp. 237–261. With 4 coloured figs. on 2 plates. [3 pages of refs.] French summary. [Inst. of Anat. & Comparative Physiol., Univ., Pavia.]

By feeding to dogs larval forms of *Diphyllobothrium ranarum* found in porcupines Storti has produced a grave and even rapidly fatal anaemia with loss of as much as half the body weight, a fall of red corpuscles to 1,000,000 and a disproportionate fall in haemoglobin. The bone marrow showed evidence of overaction. Haemosiderosis was intense in all haemopoietic organs.

C. L.

Gunn (Herbert). **The Treatment of Tape Worm through Duodenal Tube.**—*Amer. Jl. Trop. Med.* 1931. July. Vol. 11. No. 4. pp. 273–277. [6 refs.] [Med. School, Stanford Univ., San Francisco, California.]

The literature is reviewed, and 12 cases of *T. saginata* infection reported. The method was: liquid diet for a day and a half and a prepurge of castor oil the morning before treatment with an enema that night; next morning fasting, or at most, after a cup of coffee, the injection, through a tube whose end was ascertained to lie in the duodenum, of a warm suspension of Extr. filicis liq. ℥ij, saturated solution of Epsom salts ℥i, made up to about ℥iij with gum acacia mucilage, given in two halves at half hour intervals; another half ounce of Epsom salts [? solution] in an hour; and thereafter a syringeful of water till the bowels acted, or if they did not act an enema 3 hours after the last dose of vermifuge. All patients were cured without anxiety, including one whose previous experience induced him to ask whether it was advisable to make a will before treatment.

C. L.

Keilman (W. I.). [**The Influence of Helminths upon Sterility.**]—*Trop. Med. & Vet.* Moscow. 1930. Vol. 8. No. 10. pp. 51–52. [In Russian.]

A married woman had given birth to a child three years previously, and complained of subsequent sterility. A gynaecological examination

revealed no cause of sterility. Half a year later the woman passed part of the strobila of a tape-worm, ½ metre long. Specific treatment was prescribed and an entire *Taenia saginata* expelled. After one menstrual period the patient became pregnant and duly gave birth to a child.

C. A. Hoare.

Loeper, Soulié & Tonnet. Oxalémie et taenia. [**Oxalaemia and Taenia.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1931. June 8. Year 47. 3rd Ser. No. 19. pp. 952–955. [4 refs.]

This group of authors reports further on this subject (see this *Bulletin*, Vol. 28, p. 679). Their conclusions are that intestinal parasites, particularly taenia, can produce oxalic acid in the main from the glycogen they contain; that this is an important cause of their toxicity and that oxalate may be precipitated in the kidney.

C. L.

Barberi (Rafael). Diagnostico retrospectivo. Un caso de cisticercosis cerebral. [**A Case of Cerebral Cysticercosis diagnosed at Autopsy.**]—*Repert. Med. y Cirug.* Bogotá. 1931. May. Vol. 22. No. 5 (257). pp. 225–230. With 3 text figs.

Cysticercus cellulosae at the base of the second left frontal convolution of a child of 3 produced convulsions involving particularly the left side of the face and right side of the body, and copper-reducing substance in urine and cerebrospinal fluid. Death occurred within six hours of the onset.

C. L.

Dévé (F.). Sable échinococcique et rivanol. [**Hydatid Sand and Rivanol.**]—*C. R. Soc. Biol.* 1931. June 19. Vol. 107. No. 20. pp. 682–683. [1 ref.]

Pasini having recently recommended a 2 per mille solution of rivanol as a parasiticide to be used for injecting into a hydatid cyst, Dévé points out that time of contact is an essential factor. His experiments lead him to conclude that a fluid of this strength must be left in the emptied cyst for 10 minutes to kill scolices, which may mean material prolongation of the operation. He suggests that a solution of 4 or 5 per mille left for 5 minutes may prove effective.

C. L.

Zontschew (W. T.). Beitrag zur Untersuchung des Echinokokkenantigens. [**Contribution to the Study of Echinococcus Antigen.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. June. Vol. 25. No. 6. pp. 365–373. [20 refs.] [Med. Clinic, Univ., & Inst. for Health Education, Sofia, Bulgaria.]

Thirty cases were examined and the author's conclusions are these. A fruitless attempt was made to produce an antigen for a precipitin test for echinococcus on Kahn's lines. Moreover the alcoholic extract proved unspecific both for complement fixation and the skin test. On precipitation of hydatid fluid with alcohol the skin antigen is precipitated, while the complement fixation antigen loses its specific character and perhaps remains in solution. With the complete antigen Fülleborn's skin reaction gave no clear positive result. A positive early reaction (Casoni's) serves for diagnosis if a control with 1 per cent. peptone is negative. The intradermal reaction cannot take the

place of Weinberg's test. In two cases complement fixation was weaker with the specific [eigenem] antigen than with the sheep antigen of the laboratory. No paper in English is quoted in the references.

C. L.

Coutelen (F.). Présence, chez les hydatides echinococciques, de cellules libres à glycogène et à graisses. Leur rôle biologique possible. [**Presence in Hydatids of Free Cells containing Glycogen and Fat.**] —*Ann. Parasit. Humaine et Comparée.* 1931. Mar. 1. Vol. 9. No. 2. pp. 97–100. With 1 text fig. [4 refs.]

——. Histogenèse des cellules libres, à glycogène et à graisses, des hydatides echinococciques. [**Histogenesis of the Free Cells in Hydatids.**] —*Ibid.* pp. 101–103. With 1 text fig. [2 refs.] [Parasit. Lab., Faculty of Med., Paris.]

Particularly by the use of vital staining it may be shown that the germinal membrane and proliferating vesicles of hydatids are built up of distinct cells. Moreover, when examining particles of the membrane between slide and cover there are found certain free cells 10 to 30 μ or more in diameter, very refractive, the refractive granules few and small or larger or even coalescing to form a single globule. They are fatty. In addition, staining shows glycogen to be present, and the more fat there is in a cell the less glycogen.

C. L.

Miller (Harry M.), Jr. **Further Experiments on Artificial Immunity to a Larval Cestode.**—*Proc. Soc. Experim. Biol. & Med.* 1931. June. Vol. 28. No. 9. pp. 884–885. [1 ref.] [Zool. Dept. Washington Univ., St. Louis, Mo.]

After the giving of immunizing injections to rats with suspensions or extracts of *Taenia taeniaeformis*, its cysticercus (*C. fasciolaris*) completely or almost completely failed to develop in them. Injections of *T. pisiformis* had no such effect.

C. L.

Lopez-Neyra (C. R.). Relations du *Davainea madagascariensis* et des espèces parasites des mammifères. Considérations sur les *Davainea*. [**The Species of Kotlania (Davainea) infesting Mammalia.**]—*Ann. Parasit. Humaine et Comparée.* 1931. Mar. 1. Vol. 9. No. 2. pp. 162–184. With 9 figs. [10 refs.] [Lab. of Zool. & Parasit., Faculty of Pharmacy, Univ., Grenade.]

It is concluded that *Kotlania demerariensis* (Daniels, 1895) is a good species with unilateral pores, normally inhabiting American animals; and that into synonym with *Kotlania madagascariensis* (Davaine, 1869) fall *Raillietina celebensis*, *R. funebris* and probably *R. fluxa*, the worm being a normal inhabitant of Asiatic murids.

C. L.

Joyeux (Ch.) & Dollfus (R. P.). Un nouveau cas de *Bertiella studeri* (R. Bl.) chez l'homme. [**A Human Case of Infection by** *Bertiella studeri*.]—*C. R. Soc. Biol.* 1931. May 8. Vol. 107. No. 14. pp. 35–36.

Material at the Natural History Museum, Munich, yielded a specimen catalogued as collected by Maurer at Deli, Sumatra.

C. L.

Taramelli (N.) & Dubois (A.). Un cas de coenurose chez l'homme. [**Case of Coenurus Infestation in Man.**]—*Ann. Soc. Belge de Méd. Trop.* 1931. June 31. Vol. 11. No. 2. pp. 151–154. With 1 text fig. [3 refs.] [School of Trop. Med., Brussels.]

A young forest-dwelling native woman of the Eastern Province of the Belgian Congo, annoyed by the disfigurement, came for the removal of a tumour about as big as a pigeon's egg on the anterior surface of the right forearm. It turned out to be a coenurus cyst containing 145 heads arranged more or less in 6 groups, and is identified as *Multiceps glomeratus* corresponding to that described by Turner and Leiper (this *Bulletin*, Vol. 15, p. 223).

C. L.

Kamalow (N.). Beobachtungen an *Hymenolepis diminuta* (Rudolphi, 1819). [**Observations on** *H. diminuta.*]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Oct. Vol. 35. No. 10. pp. 606–611. With 6 text figs. [People's Commissariat for Public Health (N.K.S.) of Georgia, Tiflis.]

The report is based on 5 cases, worms being recovered from two by Filix mas. They measured 48 and 36 cm. long, other measurements being within accepted limits. Eggs remain alive for 2 months in faeces and all of them for 6 months in 1 in 1,000 watery solution of eosin and methylene blue ; they withstand drying for 20 hours, but the expressed onchosphere does so for a few minutes only. No success attended efforts to carry infection to white rats through the cockroaches *Periplaneta orientalis* and *Blatta germanica*. Wild rats in Tiflis were infected to 44 per cent. with from 1 to 13 worms 17 to 109 cm. long.

C. L.

Oldham (J. N.). **On the Arthropod Intermediate Hosts of** *Hymenolepis diminuta* (**Rudolphi 1819**).—*Jl. Helminthology.* 1931. Feb. Vol. 9. No. 1. pp. 21–28. [16 refs.]

Oldham has infected larvae of *Ceratophyllus wickhami* with *H. diminuta*, cites the 23 arthropods which have hitherto been found capable of acting as hosts, and notes whether infection has occurred as larva or imago. It may be useful to cite the others. Two myriapods *Fontaria virginiensis* and *Julus* sp. The rest are insects—*Blatta orientalis, Blattella germanica, Periplaneta americana, Anisolabis annulipes, Tinea granella, T. pellionella, Aglossa dimidiata, Aphornia gularis, Pyralis farinalis, Leptopsylla musculi, Ceratophyllus fasciatus, Ctenocephalus canis, Pulex irritans, Xenopsylla cheopis, Dermestes peruvianus, Geotrupes sylvaticus, Akis spinosa, Scaurus striatus, Tenebrio molitor, Tribolium castaneum, Ulosonia parvicornis.*

C. L.

Bacigalupo (J.). Evolution de l'*Hymenolepis fraterna* Stiles, chez *Pulex irritans* L., *Xenopsylla cheopis* Rothschild et *Ctenocephalus canis* Curtis. [**Development of** *H. fraterna* **in** *P. irritans, X. cheopis* **and** *Ct. canis.*]—*Ann. Parasit. Humaine et Comparée.* 1931. July 1. Vol. 9. No. 4. pp. 339–343. With 2 text figs. [8 refs.] [Central Milit. Hosp., Buenos Aires.]

The intermediate hosts of *Hymenolepis fraterna* Stiles are now enlarged to include *Ctenocephalus canis, X. cheopis, P. irritans, Tenebrio molitor*

and *T. obscurus*. Infection takes place in the larva and may be carried to the cercocystis stage either in larval or adult arthropod.

C. L.

Potapenko (N. A.) & Goutséwitch (A. W.). [**A Case of Multiple Invasion of Man by** *Hymenolepis diminuta*.]—*Trop. Med. & Vet.* Moscow. 1930. Vol. 8. No. 8–9. pp. 28–29. [In Russian.]

Eggs of *H. diminuta* were found in the faeces of a girl who has been suffering from chronic pains in the upper region of the abdomen for about three years. After treatment with male fern extract nineteen specimens of this cestode were expelled. No signs of infection could be found on subsequent examination, and the child rapidly improved in health. It was established that the house in which the girl lived was infested with rats and the food was liable to be contaminated.

C. A. Hoare.

Cobb (N. A.). **Some Recent Aspects of Nematology.**—*Science.* 1931. Jan. 9. Vol. 73. No. 1880. pp. 22–29.

Cobb has examined to his great dissatisfaction the treatment of nematology in 250 zoological and biological text books written in English, 50 being recent. "The errors, both of commission and omission, are almost incredible." The most grave are: The failure to state that nemas moult, have no cilia, have spinnerets, have no striated muscle, and that ascaris is not a typical form; the inclusion of Gordiaceae, Acanthocephala and Chaetognaths in the phylum; the failure to state that all movements are in the dorso-ventral plane, that free living nematodes are the typical forms, that parasitic forms attack plants as well as animals, that there are longitudinal lines other than the lateral ones, and that these latter are not necessarily excretory. Less grave errors are: the statement that hermaphroditism is rare, that locomotor organs are necessarily absent, that the only sense organs are on the lips; the implication that the nemic structure is simple; the statement that the life history is usually very complicated; the failure to stress their historical significance in biology such as the discovery of the coalescence of gametes and the sharing of their chromatin; the statement that nematologists exaggerate differences between related forms; the continued use of the word "worm," and a "round" worm may be no rounder than many another "worm"; the use of the word "chitin" for something which is very different; statements that nemas live on juices, are but slightly degenerate when parasitic, and are entirely devoid of segmentation; their collection into few families. There is a plea for the proper use of the microscope, thus making the nematode a fascinating study even for the dainty and refined girl student before whom to place an ascaris is felt to be a disgusting procedure. There is pointed out the immense economic importance of nemas in human and veterinary medicine and in agriculture and it is urged that most trained zoologists need to take a few weeks' course of study with original nemic literature and a microscope with a good oil immersion lens.

C. L.

Otto (G. F.), Cort (W. W.) & Keller (A. E.). **Environmental Studies of Families in Tennessee infested with Ascaris, Trichuris and Hookworm.**—*Amer. Jl. Hyg.* 1931. July. Vol. 14. No. 1. pp. 156–193. [36 refs.]

This seems to be largely based on work already published but it will repay study. It is concluded that ascaris infection is directly related to defaecation habits, and regarding these the following quotations dealing with rural families in Tennessee show an amazing condition. " In their attitude towards the disposal of human excrement these people are in general surprisingly primitive. . . . The use of even the simplest privy seems a new idea. . . . In some isolated communities which we visited, even some of the wealthier families who lived in large well-built houses and had reached the stage of the automobile and the radio, were still entirely without privies . . . Where the privies are exclusively used they of course gradually eliminate ascaris infection. . . . Of special interest are the number of families where heavy ascaris infestation exists in spite of the presence of privies." [It seems almost completely forgotten that Stiles showed (*Public Health Reports*, 1915, July 2) that for the dissemination of ascaris and other coprophagic infections a privy may itself have a *radius of influence* for evil.] Human ascaris and trichuris eggs were found in chicken droppings, though about an eighth of eggs were broken up, evidently by the gizzard. Regarding the viability of eggs which have passed through animals in experiments, the percentage numbers were 16·5 to 40·5 in 3 chickens, 52·3 to 76·2 in 3 dogs and 69 in one cat. Trichuris infection was lower than but parallel to ascaris infection. Hookworm infection was found definitely correlated with sandy soil, thus confirming once more Stiles's observation nearly 30 years old. Enumeration in experimental cases was by Stoll's technique and, when this failed [as it must do in light cases] by D.C.F. (direct centrifugal floatation).

C. L.

Lamson (P. D.), Caldwell (E. L.), Brown (H. W.) & Ward (C. B.). **Hexylresorcinol in the Treatment of Human Ascariasis.**—*Amer. Jl. Hyg.* 1931. Mar. Vol. 13. No. 2. pp. 568–575. [5 refs.] [Med. School, Vanderbilt Univ., Nashville, Tenn.]

——, Brown (H. W.), Robbins (B. H.) & Ward (C. B.). **Field Treatments of Ascariasis, Ancylostomiasis, and Trichuriasis with Hexylresorcinol.**—*Ibid.* May. Vol. 13. No. 3. pp. 803–822. [32 refs.] [Med. School, Vanderbilt Univ., Nashville, Tenn.]

Examination of records of the International Health Board covering several million treatments showed the authors that only when carbon tetrachloride came into use did there appear records of deaths due to activation of ascarids by the drug. The tests of hexylresorcinol now reported are an attempt to find a non-toxic ascaricide, and this drug was " active on ascarids in vitro killing them without initial stimulation." Colorimetric tests indicate that most of the drug is unabsorbed from the host's intestine.

" Up to this time the most effective anthelmintics with the exception of tetrachlorethylene have been substances which were toxic or produced severe symptoms if absorbed, and great stress has been put upon the use of cathartics shortly after treatment in order to eliminate the drug and

prevent absorption. With hexylresorcinol this danger does not have to be avoided, which puts the drug in an entirely different class and may possibly allow its general use by the laymen, as one need not fear intoxication from lack of elimination."

[This statement cannot be passed. CAIUS and MHASKAR (this *Bulletin*, Vol. 17, p. 75) showed that when thymol was properly particulated all was absorbed, none being found in the faeces by tests which detected the loss of 5 per cent. of half a grain, and this even when the drug was given with Epsom salts which produced active purgation within 45 minutes. The abstract says, " *The necessity of the after purge becomes therefore questionable* . . . The authors maintain that their work shows that hookworm treatment may be effectively reduced to the simple ingestion of the drug in proper dosage."* It remains to add that properly particulated thymol had an anthelmintic efficiency in the hands of these careful workers exceeded neither by oil of chenopodium nor carbon tetrachloride.]

The number of cases reported on is 1,500 ; the drug was given in crystalline form in hard gelatin capsules.

" Enormous clinical experience with this substance shows that it can be taken in very large amounts with no signs of intoxication." Nevertheless, " when such capsules are given to dogs and the stomachs examined within 4 or 5 hours after the administration of the drug some animals show nothing whatever, while in others irritation varying from small reddened areas to a general reddening with petechial haemorrhages . . . were seen . . . 24–48 hours after administration all signs of irritation have practically disappeared." " Children of six and eight years of age have been given as much as 1 gram of hexylresorcinol in a single dose but as some of these children had a certain amount of gastric irritation and as a dose of 0·6 to 0·8 gram was found effective, a large dose was considered unnecessary."

As regards efficacy, all depends on scrupulous abstention from all food, for the drug combines with albumen and becomes inert.

	Percentage of original numbers of eggs remaining				Percentage of cases remaining infected			
	Drug followed by				Drug followed by			
	Water		Mineral Oil		Water		Mineral Oil	
	Cases unfed	Cases fed	Cases unfed	Cases fed	Cases unfed	Cases fed	Cases unfed	Cases fed
Ascaris ...	12	24	8	57	53	60	30	60
Hookworms ...	21	89	23	35	46	55	43	100
Trichuris ...	34	38	33	36	60	58	54	100

Similarly given with vegetable oil or glycerine it is pleasant but little active ; given with mineral oil there is slightly increased efficiency, offset by the disagreeable taste of the oil violently objected to by many

* Italics in abstract.

young children. Capsules of the crystals placed on the back of the tongue "would seem to be an ideal form of administration except for the fact that the crystals react with the gelatin after a time and such capsules are not stable." The efficiency of 0·8 gm. given to children between 7 and 14 years has varied between leaving none infected with ascaris in a school where the regime was strict, and the passage of almost no parasites in another group the members of which had almost all eaten breakfast before taking the drug; so it is suggested, though the matter has not been tested, that the evening meal should be limited to a little bread and milk, followed by salts on rising, hexylresorcinol being given several hours later, the first food of that day taken 4 or 5 hours after the drug. Other percentage figures of the drug's anthelmintic value in the same dose are shown in the table.

Egg counts were by the Stoll-Hausheer method which uses for each examination one two-hundredth of a gram. "*Our results are based on the accuracy of this method. The cases reported as negative after treatment were examined by this same method.*"* The egg numbers were reduced to a "formed basis."

C. L.

Brown (H. W.). **Effect of Hexylresorcinol upon Ascaris and Hookworm Eggs.**—*Proc. Soc. Experim. Biol. & Med.* 1931. June. Vol. 28. No. 9. pp. 1036–1039. [5 refs.] [Med. School, Vanderbilt Univ., Nashville, Tenn.]

Ascaris eggs were obtained from the anterior 2 inches of the chopped uteri and well shaken to prevent their forming large adherent masses, for if these persist the eggs in the centre develop normally in the fluids here reported on. Hexylresorcinol is soluble in tap water to about 0·05 per cent. Ascaris eggs may remain in this solution for 15 hours without damage; after 27 hours some, and after 16 days all, are killed. In a 0·01 per cent. solution development is normal. In a 0·1 per cent. solution in 0·2 per cent. of sodium bicarbonate most eggs are killed in 2, and all in 5 hours, yet it is held that an efficient solvent considerably decreases the effect of the drug since a solution of this strength in 30 per cent. glycerine or 1 per cent. caustic potash did not prevent normal development of eggs. When the albuminous coating is first dissolved in this last fluid, 0·1 per cent. hexylresorcinol solution kills in 15 minutes, and it is apparently held that the usual deep brown colour of the eggs is a property of the protoplasm and not of this coating since it is said that immediately after their immersion in 1 per cent. hexylresorcinol "they appeared cleared, the cytoplasm changing from the usual deep brown to a very light yellow." From eggs which have lain in hexylresorcinol, 1 per cent. caustic potash does not dissolve the albuminous coating in 48 hours. Resorcinol solutions up to 1 per cent. permit normal development. Hookworm eggs obtained by washing after floatation are killed in 24 hours by a 0·05 per cent. solution of hexylresorcinol. The strength which killed them in fluid faeces is not precisely stated. In 0·05 per cent. solution "early filariform larvae" were all dead in 10 minutes. The best distinction between live and dead ascaris eggs is held to be their behaviour when placed in a favourable medium.

C. L.

* Italics in original.

CORT (W. W.). **Recent Investigations on the Epidemiology of Human Ascariasis.**—*Jl. Parasitology.* 1931. Mar. Vol. 17. No. 3. pp. 121–144. [31 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

As the result of egg counts by Stoll's technique and of examination of soil for ascaris eggs, soil pollution by younger children has been convicted as a fertile source of infection. Infection is familial, 50 per cent. of the worm load lies on 5 per cent. of the inhabitants, and the crowded conditions of poorly sanitated cities greatly favour its spread. The resistance of the eggs to desiccation is considerable but not complete, and it is suggested that prolonged drought, the heat of direct tropical sunrays, and prolonged cold are the seasonal elements making for lessening of infection. The rapidity of reinfection is emphasized, as is the need to provide privies usable by children.

" Since the presence of this parasite in both cities and rural communities over such wide areas of the world can be used as an index of the status of sanitation it seems that campaigns for its control might form a larger part than at present of programs for the improvement of sanitary conditions."

C. L.

MORGAN (D. O.). **Some Observations on Experimental Ascariasis in Pigs.**—*Jl. Helminthology.* 1931. July. Vol. 9. No. 3. pp. 121–128. With 1 graph. [4 refs.]

Three pigs when two months old and again when three months old, were fed with large numbers of embryonated eggs of *A. lumbricoides* from the pig. They developed no symptoms and passed no eggs. When 5 months old these three and another from the same litter received much larger quantities of embryonated eggs, and all died with large numbers of larvae in livers and lungs. Half the lungs of one were fed to another pig, and extractions of the liver and of the other half of the lungs were divided between two more. They developed no symptoms since, as it is put, " the larvae had already completed the migratory part of their life history in another pig." Each had a natural infection but the number of eggs to a modified Stoll technique increased 10 and 13 fold in two of them in 3 weeks. From the 8th to the 22nd week the numbers fell almost to vanishing point, and unfertile eggs only were found from the 16th week. Two of these pigs were killed 3 weeks later ; one contained no ascarids, the other two unfertile females. When 10 months old the third was given a large dose of embryonated eggs from an old culture in which many of them were non-viable. It died from pneumonia with large numbers of larvae in the lung, and a fair number in the intestine, which contained also two unfertile females. It is pointed out that neither ageing nor present infection of the host prevented infection, but that the worm load was almost entirely lost in 22 weeks even with the chance of reinfection not eliminated, suggesting self cure or an acquired immunity of short duration.

C. L.

Buckley (J. J. C.). **An Observation on Human Resistance to Infection with Ascaris from the Pig.**—*Jl. Helminthology.* 1931. May. Vol. 9. No. 2. pp. 45–46. [3 refs.]

About 20 ascaris larvae from the lung of a young pig were swallowed by the author, while large numbers were fed to a green monkey and to young pigs. Only the last became infected and they heavily so. No mention is made of control feedings to pig or man.

C. L.

Nowak (H.). Ueber Häufigkeit, Symptomatologie und Therapie der Askaridiasis. [**Prevalence, Symptomatology and Treatment of Ascariasis.**]—*Med. Klin.* 1931. Apr. 17. Vol. 27. No. 16 (1375). pp. 581–583. [17 refs.]

Of 1934 country people examined in Vienna 72·5 per cent. gave a history of passing ascaris and, it is noted, this means a considerably lower figure than that which would be recorded by faecal examinations for eggs. Over 46 per cent. of the infected were between 5 and 15 years of age. There were 838 infections in males as against 566 in females; the greatest number of infections was found in May and the lowest in January, but the percentage of infected to examined for different months is not stated. Regarding skin reaction to the intradermal injection of antigen, 4 of 18 persons who gave a history of passing worms were negative to it. In 9 of 11 patients, with history of passing ascarids within 1 to 5 years but in whom no eggs were found in the faeces, presumably by smear, at the time of examination, the reaction was positive. Treatment was by oil of chenopodium in hard gelatine capsules in " Deeks' " dosage, without ill effects, 75 per cent. being free from relapse [Rezidivfreiheit] after it.

C. L.

Smirnow (G. G.). Ueber die Wirkung der Anthelminthica auf die Wanderung der Ascaridenlarven. Experimentelle Untersuchungen. [**Effect of Anthelmintics on the Migration of Ascarid Larvae.**]—*Ztschr. f. Parasitenk.* 1931. Apr. 20. Vol. 3. No. 2. pp. 173–184. [13 refs.] [Zool. Inst., Military Med. Acad., Leningrad.]

After a consideration of the literature, *in vitro* experiments are described, the material being ripe ascaris eggs whose embryos had been artificially hatched by pressure between slide and cover. A saturated solution of santonin in olive oil was no more lethal to these larvae than the oil alone; a saturated watery solution of sodium santonate killed all in 5 hours, while a minority survived in water after 24 hours. In a tenth-saturated watery solution of the santonate most were alive after 24 hours whether bile was added or not; and a few after 48 hours, in the solution without bile, the effect of the addition of bile for 48 hours not being noted. Pure bile and oil of chenopodium were more deadly. A dose of santonin of 0·5 gm. (7½ grains) per kilo was sometimes, a larger one always, fatal to guineapigs, the symptoms being tremors, convulsions, staggering and cramp.

Ten guineapigs were fed with larvae of *A. suilla* or *A. megalocephala*, and for 0–10 days before and for 2 days after the feeding had oral doses of santonin from 0·1 to 0·5 gm. Nine of them died and from the livers of all and the lungs of seven of them larvae were obtained. Like results followed injections of sodium santonate and oil of chenopodium

by mouth. No effect on larval wandering within the body was, then, produced by these huge doses of the drugs. It is pointed out that the mode of action of "santonin-bile" on adult ascarids is outside the scope of the investigation.

C. L.

Taylor (E. Leonard) & Purchase (Harvey S.). **Do Penetrating Nematode Larvae assist Bacterial Invasion from the Bowel?**—*Parasitology.* 1931. July. Vol. 23. No. 3. pp. 301–309. [19 refs.]

In these experiments ascaris eggs containing infective embryos were fed to guineapigs who at the same time received vegetative forms of spores of anthrax; no infection was produced. Suspension of *Bact. suipestifer* in 1/25 cc. dosage having proved consistently fatal to rabbits and 1/75 cc. occasionally so, the latter dose was given with embryonated eggs. No death resulted in 5 rabbits, nor did any follow in 5 others to which the bacillus alone was fed. "The most likely explanation for the apparent failure of the ascaris larvae to assist infection with *B. suipestifer* appears to be that the number of bacteria entering the tissues with the larvae is insignificant compared with the number which enter without their aid." That the larvae penetrated the alimentary mucosa was shown by their recovery from the lungs where they were apt to produce a so-called verminous pneumonia. Reference is made to the positive experiments which have followed cutaneous infections.

C. L.

Perkins (William Harvey). **Studies on the Hookworm Larva as a Vector of Pathogenic Micro-Organisms: Ingestion of Bacteria by Hookworm Larvae.**—*Proc. Soc. Experim. Biol. & Med.* 1931. Apr. Vol. 28. No. 7. pp. 754–756. [1 ref.] [Med. School, Tulane Univ. & Charity Hosp., New Orleans.]

The author's conclusions were as follows:—

"1. The mouth parts and alimentary canal of immature larvae of *Necator americanus* are of such size as to accommodate particulate matter of bacterial magnitude. 2. Particles morphologically resembling colon bacilli and staphylococci have been seen within various portions of the alimentary canal of immature larvae of *Necator americanus* which had been living in a medium containing these micro-organisms. 3. Sheathed larvae of *Necator americanus* have been seen to carry bacteriform bodies within their sheath spaces for periods of from 1 to 31 days after the second ecdysis."

No staining was employed.

C. L.

Blackie (W. K.). **Observations on the Immunity Response in Experimental Ascariasis in Rabbits.**—*Jl. Helminthology.* 1931. May. Vol. 9. No. 2. pp. 91–96. With 1 graph in text. [5 refs.] [School of Hyg. & Trop. Med., London.]

The author points out that owing to the definite migratory route of *Ascaris lumbricoides* through the liver and lungs of the host prior to its final localization in the intestine, a definite serological response might be anticipated. To test this idea two rabbits were experimentally

infected with the embryonated eggs of *Ascaris megalocephala*, their sera being tested by means of the complement fixation reaction using an antigen prepared as an alcoholic extract from the dried powered egg-containing uterus of the adult female. A definite immunity response was noted during the first five weeks of infection, and an interesting graph is included showing a rise of titre to 18 M.H.Ds. of complement on the 15th day after exposure.

N. Hamilton Fairley.

Gébel (Georges). Recherches sur les lésions pathologiques provoquées par les ascarides et sur la fréquence de ces vers dans le canton de Genève. [**Lesions caused by Ascarids. Their Frequency in Geneva Canton.**]—*Rev. Méd. Suisse Romande.* 1931. Apr. 25. Vol. 51. No. 5. pp. 264–290. With 11 figs. [14 refs.]

Instances of well recognized ill-effects of larval and adult ascarids are described and illustrated. Microscopic examination of the stools of 142 children up to 16 years of age showed ascaris eggs in 7·1 per cent.; half of the infected showed trichuris eggs also. There were no eggs in 68 adults. At autopsy adult ascarids were found in 2 of 18 children and 3 of 393 adults. Using two fresh smears in each instance ascaris eggs were found in 1 of 300 excised appendices.

C. L.

Gruber (Georg B.). Bauchfellentzundung durch Askariden. [**Peritonitis caused by Ascarids.**]—*Muench. Med. Woch.* 1931. July 3. Vol. 78. No. 27. pp. 1129–1131. [16 refs.] [Path. Inst., Univ., Göttingen.]

A boy of 3 passed about 60 ascarids after santonin; four weeks later he got measles with pneumonia and faecal vomiting. He died immediately after laparotomy which disclosed general peritonitis with a number of ascarids in the peritoneal cavity. Autopsy showed that they reached it through a perforation 75 cm. above the ileocaecal valve.

C. L.

Paterson (A. S.). **Pulmonary Abscess caused by** *Ascaris lumbricoides.*—*Jl. Roy. Nav. Med. Serv.* 1931. July. Vol. 17. No. 3. pp. 211–212.

A right-sided localized pleurisy, with effusion as the needle showed, with small haemoptyses, intermittent rises in temperature but no night sweats, suggested tuberculosis, though 45 sputum examinations showed no bacilli and guineapig inoculation of the pleuritic fluid was negative. After more severe haemoptyses and a right sided phrenectomy (the illness having lasted over 9 months) he expectorated a female ascaris 8 in. in length. It is noteworthy that there is no mention of eggs in the sputum. After a thoracoplasty progress has been made.

C. L.

Nandi (P.). & Ganguly (Rabindranarayan). **Anthelmintics against Ascaris lumbricoides. A Comparative Study of their Efficacy.**—*Calcutta Med. Jl.* 1931. Apr. Vol. 25. No. 10. pp. 359–363. [5 refs.]

Tests were carried out with 1 per cent. solutions on earthworms only, it being stated [optimistically] that "the action of the drugs on earthworm and ascaris has been found to be almost identical." The drugs are placed in this order: *Serratula anthelmintica, Embelia ribes, Butea frondosa,* thymol, "carbon-tetrachlor," turpentine oil, santonin, oil of chenopodium, betanaphthol.

C. L.

Henry (A.). L'infestation prénatale dans l'ascaridiase des carnivores. [**Prenatal Infestation of Carnivora with Ascaris.**]—*Bull. Acad. Méd.* 1931. Mar. 17. Year 95. 3rd Ser. Vol. 105. No. 11. pp. 462-464.

In 3 stillborn fox cubs of a litter many living ascarid larvae were recovered from the lungs and trachea, the lung tissue being marbled with fine haemorrhages.

C. L.

Bearup (A. J.). **The Intensity and Type of Hookworm Infestation in the Ingham District of North Queensland.**—*Med. Jl. Australia.* 1931. July 18. 18th Year. Vol. 2. No. 3. pp. 65–74. [10 refs.] [School of Public Health & Trop. Med., Sydney.]

In the town of Ingham the sanitary service is a double pail one; in rural parts 10 per cent. of farms are without privies and 75 per cent. of privies allow soil pollution, while night soil is buried in or thrown amongst the sugar cane. For this investigation large faecal specimens were obtained in tins which reached the laboratory within 24 hours and were there kept at about 6° C. Counts were by the Caldwell's method and if two such films showed no eggs but D.C.F. did, the count was entered as 25 eggs per gram. A consistency allowance was made although the grounds for doing so are held to be far from satisfactory since there are so many sources of error affecting egg counts that it is not worth while to make more than one on each specimen. Faecal specimens kept in cold storage for 8 weeks showed no loss of ova to the Caldwell's method; but they were in fact injured, for after a day or two in the cold the eggs failed to develop beyond the tadpole stage when placed in favourable conditions. Instances of familial [and presumably dejectional] infection were striking. In one group 8 households or 10 per cent. of the group were responsible for 47 per cent. of the ova. The ordinary vermifuge for adults was carbon tetrachloride 2 cc. and oil of chenopodium 1 cc. Re-counts were made 2 to 4 weeks later and in 37 of 157 cases higher counts than before were then obtained. It is considered that the dry weather conditions which held would keep down infection, so that many treatments must have been taken improperly or not at all; [which conclusion, it may be noted, assumes that the counting technique was adequate and the privies, natural or artificial, used were dry spots]. It is pointed out that the counting methods of Caldwell and Stoll take up too much time for general use in field work and that some sufficiently accurate method is required for estimating the number of eggs present.

C. L.

Cordes (Wilhelm). **The Clinical Importance of Hookworm Infestation among the Population of the Preston Division, Oriente, Cuba.**—*Nineteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1930. pp. 81–84. [5 refs.] [United Fruit Company Hosp., Preston, Cuba.]

"Hookworm incidence among the population of Preston Division is low. It is probable that less than 10 per cent. of the laboring class are infested; and the great majority of these carriers show no symptoms of suffering from harboring the parasites. Only occasionally is an actual case of hookworm disease observed, which manifests itself by a Stoll count of more than 10,000 eggs per cc. of formed stool.

" Patients showing 2,000 to 10,000 eggs require attention and specific treatment.

" Cases with egg counts up to 2,000 are clinically negligible, unless hookworm is associated with other anemia-producing diseases and faulty nutrition. A period of hookworm treatment of such individuals is often indicated ; but one should not cling to the belief that he has thereby gotten to the root of the evil.

" To paraphrase Manson-Bahr's metaphor : hookworm may be the straw that breaks the camel's back, but yet, it remains a straw. Far more important is it to relieve the patient from his other burden—*i.e.*, to teach him the measures for the prevention of hookworm infestation and the principles of a well balanced diet " [and yet the straw does break his back].

C. L.

Otto (G. F.) & Cort (W. W.). **The Present Status of Hookworm in the South.**—*Jl. Amer. Med. Assoc.* 1931. July 11. Vol. 97. No. 2. pp. 92–93. [8 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

The authors support Stiles's conclusions (this *Bulletin*, Vol. 28, p. 228) that hookworm disease is still widespread in the southern part of the United States, particular areas being cited. It is held that the time has come when an attempt should be made, by *new* methods of study, particularly by the dilution egg counting [which in 1897 led Looss to the skin infection route of hookworms] and by Baermann's apparatus to evaluate the progress of the last 20 years and form a real scientific basis for future work.*

C. L.

Payne (George C.) & Payne (Florence K.). **Observations on Rate of Loss of** *Necator americanus.*—*Amer. Jl. Hyg.* 1931. July. Vol. 14. No. 1. pp. 149–155. [6 refs.]

The authors point out that the rate of loss of hookworms, as indicated by Chandler's egg counts on prisoners admitted to a Calcutta jail (this *Bulletin*, Vol. 23, p. 773) amounts in three months to 500 for every 1,000 worms harboured or if the loss is uniform, 40 per 1,000 per week. Two cases were admitted to hospital having, as anthelmintics later proved, known hookworm populations of 1218 and 3033, were egg counted daily by Stoll's original method with allowance as he advised for stool consistency, and every stool examined personally by the authors for worms. A third patient was investigated out of hospital who carried on his normal work but came, not quite regularly, to pass stools in hospital for like examination. The recovery of worms from the stools over the observation periods was 15 ; by Chandler's curves it should have been 570. Nor do the egg counts, which in these heavy infections must have been nearly accurately measured, suggest any loss of worms. It is pointed out that except for the administration of treatments these persons suffered no change in environment calculated to influence the loss of worms.

C. L.

* Italics not in original.

ROTTER (Werner). Ueber die histologischen Veränderungen des Dünndarms bei Ankylostomiasis. [**Histological Changes in the Small Intestine in Ankylostomiasis.**]—*Virchows Arch. f. Path. Anat. u. Physiol.* 1931. Apr. 23. Vol. 280. No. 3. pp. 587–594. With 8 figs. [San Juan de Dios Hosp., San José, Costa Rica.]

Writing from San José, Costa Rica, Rotter reports that in almost all chronic cases of ankylostomiasis there are changes in the small intestine: punctiform haemorrhages in the mucosa, and larger ones in the submucosa, going on to thickening, granulation tissue and necrosis. There is also loss of epithelium and necrosis of the underlying connective tissue at the site of bites.

C. L.

McCOY (O. R.). **The Egg Production of Two Physiological Strains of the Dog Hookworm,** *Ancylostoma caninum.*—*Amer. Jl. Hyg.* 1931. July. Vol. 14. No. 1. pp. 194–202. With 1 graph in text. [11 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

The writer's conclusions are :—

" 1. The egg production of a cat strain of *Ancylostoma caninum* in cats was approximately 2,350 eggs per day per female as compared with the normal egg production of 16,000 eggs per day per female by a dog strain of *A. caninum* in dogs.

" 2. The dog strain when introduced into cats produced an average of only 2,340 eggs per day, approximately the same number as did the cat strain. Infections of the dog strain in the cat, however, were of shorter duration than those of the cat strain.

" 3. When infections of the cat strain were established in dogs, the egg production averaged 11,600 eggs per day per female.

" 4. Apparently egg production is controlled by the host and is not inherent in the strain of worms."

[Control by the host species is evidently intended. Possible control of oviposition by the individual host within the species has not hitherto been considered in converting egg counts to worm loads.]

C. L.

OKADA (Ryoichi). **Experimental Studies on the Oral and Percutaneous Infection of** *Anchylostoma caninum.* **(First Report.) Rate of Primary Infection, Reinfection and Superinfection in Normal Host, Dog.**—*Japanese Jl. Experim. Med.* 1931. June 20. Vol. 9. No. 3. pp. 209–222. **(Second Report.) Destiny of Mature Larvae of** *Anchylostoma caninum* **infected Orally and Percutaneously.** pp. 223–235. **(Third Report.)** pp. 237–267. **(Fourth Report.)** pp. 269–280. [Govt. Inst. for Infectious Diseases, Imperial Univ., Tokyo.]

i. Primary oral infection with 100 infective larvae of *A. caninum* resulted in an average infection with 70 worms in pups, 50 worms in adult dogs, 20 in old ones. Similar reinfection after 8 to 25 days in pups resulted in an average infection of 66 worms, in adult dogs after 13 days of 31 worms. Results of " superinfection " are also given. [Here

too apparently there were two infections with 100 larvae each, so that the distinction between this and reinfection is not understood. Moreover the table shows the age of adult dogs as 1 and 2 days, so that the figures need not be given.]

ii. 30,000 infective larvae were fed to a pup and to an old dog and were applied to the skin of another pup. The table shows the number of larvae or young forms recovered from the faeces over the period of investigation and the numbers of grown forms in the gut when the hosts were forthwith killed. In these experiments the advantage to the worm of cutaneous infection is overwhelming.

Mode of Infection	Age	Period of Experiment in Days	Larvae found in Faeces	Larvae found in Gut of Killed Host
Oral	Pup	10	8,000	5,807
Oral	Grown Dog	20	2,600	157
Cutaneous ...	Pup	8	116	26,100

Moreover larvae passed *per anum* were still infective to pups, namely 60·3 per cent. of those passed by a pup and 12 per cent. of those passed by the grown dog.

iii. The results seem to be those reported by MIYAGAWA and OKADA [see below].

iv. Development up to 7 days was rather more rapid after cutaneous than oral infection ; after that no difference was detected.

Into a Vella fistula, an isolated loop of small intestine, 30 cm. long, 10,000 infective larvae of *A. caninum* were introduced. Its opening was plugged and bandaged to prevent licking and was washed through after 6 hours and thereafter daily till it died after 10 days. In the washings 613 larval or young worms were found, in the Vella fistula after death 351 worms and from the main intestine, which the worms must have reached after traversing liver and lungs, 6,917 worms. " Considering this fact, it is quite evident that the larval migration in the host's tissue, especially in the lungs, is a most significant act for their future development."

[Fülleborn's contrary conclusions accepted in this *Bulletin* Vol. 24, p. 540, merit reconsideration. He reported that he introduced into a Vella fistula 900 infective larvae of the dog necator *Uncinaria stenocephala* and plugged it, muzzling the dog. In fluid which trickled out when it was unplugged ½ hour later, 3 larvae were found, but subsequently none. Hookworm eggs began to appear in the dog's faeces passed *per anum*, 21 days after infection, in 2 weeks reached a maximum of 1,300 per gram and had disappeared in 5 months. The fistula was washed through 21, 24, 29 and 45 days after the larvae had been introduced into it, but no hookworm eggs were ever found. There seems no explanation but that the infective larvae, except the 3 which were recovered from the fistula, entered its wall, and that all of them which reached maturity did so in the main gut after passing through the liver and lungs.]

C. L.

Miyagawa (Yoneji) & Okada (Ryoichi). **Biological Significance of the Lung Journey of Anchylostoma Larvae in the Normal Host. (Second Report.)**—*Japanese Jl. Experim. Med.* 1931. June 20. Vol. 9. No. 3. pp. 151–207. With 16 figs. on 2 plates. [Govt. Inst. for Infectious Diseases, Imperial Univ., Tokyo.]

The paper begins with what is evidently an error since it corresponds neither with fact nor reason. " In our first report [this *Bulletin*, Vol. 28, p. 238] we gave out the following facts concerning the hookworm infection, that, even if the mature hookworm larvae infect the normal host, they are never able to develop to the adult stage." The present experiments indicate that mature larvae of *A. caninum* rarely develop in the rabbit to the extent of producing the primitive oral capsule, but that they are more likely to do so if they have spent even two hours in a pup or even been placed in saline emulsion of its tissues—skin, lung, stomach or intestinal wall, or in its natural gastric juice.

C. L.

McCoy (O. R.). **Immunity Reactions of the Dog against Hookworm (*Ancylostoma caninum*) under Conditions of Repeated Infection.**—*Amer. Jl. Hyg.* 1931. Sept. Vol. 14. No. 2. pp. 268–303. With 7 graphs in text. [19 refs.] [School of Med. & Dentistry, Univ., Rochester, N.Y.]

The method employed was to feed dogs or cats with a known number of infective larvae of *A. caninum* enclosed in a double gelatine capsule, and after 2 or 3 weeks to enumerate twice weekly by Stoll's method the eggs found in a known fraction of the total amount of faeces which had been passed since the last counting. The faeces had been kept in " tightly sealed jars," and in a refrigerator overnight in warm weather. By dividing by the number of days concerned, the egg numbers were expressed as eggs per day, a procedure which eliminated day to day variations. At least 2 counts were made from each specimen. As a rule larvae were fed to dogs in increasing doses at weekly intervals up to about the 19th week, and then in large doses (10,000 to 15,000) with a 4-weeks' pause. Taking 4 pairs of dogs, each pair from one litter, the variations between maximum egg counts were almost as 11 to 18, 11 to 33, 14 to 53, and 32 to 33 ; so that counts might be almost equal in corresponding pairs or one specimen might give nearly 4 times as many eggs as its pair. In two instances a third pup was taken from two of the litters, and brought into the experiments later—on the 19th and 25th weeks respectively. The newcomer started with the large dose which its mates were at that date receiving. In neither of the newcomers did the number of eggs passed later exceed that passed by at least one of its previously and regularly infected littermates of the same age. In another experiment of the same kind, two dogs, first infected 6 and 16 weeks after their fellows, produced an egg peak about twice as great as the first dog did at the same period.

Part of McCoy's conclusions are that in 6 cases of heavy infection egg counts reached a peak of several million eggs daily during the first 3 months, with haemoglobin dropping to 25. Two dogs died. In the four survivors the egg count suddenly dropped in spite of heavy doses of larvae, with passage of large numbers of adult worms and a rise in haemoglobin. Two dogs were reinfected but with even more rapid throwing off of infection. It is believed that in all cases even of light infection some immunity, not age immunity, was developed, but in no case was there natural disinfestation. In six cats, an increased

resistance apparently distinct from age resistance was believed to occur. An important practical point for those who believe or disbelieve that the worm load can be measured by egg counts is that in 10 of these resistant dogs the egg output was a third of the generally accepted normal figure.

C. L.

STUMBERG (John E.) & RODRÍGUEZ-MOLINA (Rafael). **Hypersensitiveness to Hookworm Proteins in Porto Rico.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. Sept. Vol. 7. No. 1. pp. 37–49. [10 refs.] [Johns Hopkins School of Hyg. & Public Health Baltimore, & School of Trop. Med., San Juan.]

It has not been found possible to write a clear abstract of this paper. Sixty persons of both sexes from four to sixty years of age were examined for reactions to antigens composed of dried *N. americanus*, *A. lumbricoides* and *Bact. coli* and apparently also to dried infective hookworm larvae. Whether they were all infected with either or both of the two nematode parasites seems nowhere stated. The amount of infection was measured by Stoll's method, two counts from 0·15 cc. of suspension on each occasion being made. [This technique could demonstrably not differentiate infected from not infected persons as seems essential to do in such an investigation as this.] An anthelmintic was given, but no attempt is mentioned to determine whether or not it was effective; and re-examination as to sensitiveness was made 5 months later, no steps being reported as taken to ascertain whether any and if so how much infection had been acquired meantime. The authors' conclusions, among others, are that there seems to be no definite relationship between a "positive wheal" and the presence of infection, and that an intradermal reaction is too variable to be used for diagnosis so far as it is based on the size of the wheal, and the size and presence of pseudopods, but that there is a possible quantitative relation between the duration of the wheal and infection.

C. L.

KITAMURA (K.). Experimentelle Dermatitis durch wiederholte Applikationen der Hakenwurmlarven auf die Haut. [**Dermatitis produced by Repeated Application of Hookworms to the Skin.**]—*Japanese Jl. Dermat. & Urol.* June. 1931. Vol. 31. No. 6. pp. 866–883. With 2 figs. & 9 charts in text. [13 refs.] [In Japanese. German summary pp. 64–65.] [Dermato-Urol. Clinic, Med. Acad., Kumamoto.]

Local reaction of guineapig's skin to penetrating larvae of *A. caninum* becomes greater with repeated applications; a short interval increases the irritation. A local hypersensitiveness develops and is not usually lost, while the rest of the skin may react normally, or excessively, but never subnormally.

C. L.

EPSTEIN (C. I.). [**First Case of Ancylostomiasis in Astrakhan.**]—*Trop. Med. & Vet.* Moscow. 1930. Vol. 8. No. 10. pp. 48–50. [In Russian.]

The author records the first case of hookworm infection observed in Astrakhan. As the patient had lived in Persia and in Baku it was probably not of local origin.

C. A. Hoare.

SANDGROUND (J. H.). **Studies on the Life-History of *Ternidens deminutus*, a Nematode Parasite of Man, with Observations on its Incidence in Certain Regions of Southern Africa.**—*Ann. Trop. Med. & Parasit.* 1931. Aug. 13. Vol. 25. No. 2. pp. 147–184. With 2 plates. [17 refs.] [Harvard Med. School & Museum of Comparative Zoology, Harvard Univ., Boston.]

An important paper. While agreeing to the possibility that certain eggs already reported upon (this *Bulletin*, Vol. 27, p. 468) were those of trichostrongylus (they were in morula when passed in the faeces and had one pole more sharply rounded than the other), Sandground shows by recovery of worms after anthelmintics that *Ternidens deminutus* is a not uncommon parasite of man in certain areas of Southern Africa. The egg is regularly ellipsoidal with broadly rounded poles and perhaps with one side more flattened than the other; the average size of 100 was 84 μ by 51 μ and when passed they usually were 8-celled, but might have only 4 or 2 metameres. From the uterine eggs of worms (expelled by anthelmintics) kept on the bench with a daily range in temperature between 13° C. and 30° C. there hatched in 40 to 48 hours a rhabditiform larva 0·3 to 0·36 mm. long having a flagellum-like tail 70 μ long. The sheathed infective filariform larva is 0·63 to 0·73 mm. long. On drying, structure becomes almost unrecognizable, but on adding water larvae slowly revive, often losing the sheath in so doing, and appear then to be incapable of surviving a second drying. "From these observations it is apparent that in nature the larvae of Ternidens are well-equipped to withstand the frequently protracted periods of drought that is characteristic of their geographical environment." Infective larvae show the usual migratory instinct. Heat activates these larvae but little, their movements remaining very lethargic; this absence of activation being designated absence of positive thermotropism. It is held that this explains the poor isolation of larvae which was obtained by Baermann's apparatus. Penetration of skin was poor if it existed at all, eleven and nine of 12 larvae placed on it in each of two experiments being recovered, and no signs of infection appearing afterwards.

The eggs were found in 227 of 1,294 examinations by Willis's technique, the numbers varying from 0 in 54 at Livingstone, N. Rhodesia and 1 in 323 at Lourenço Marques to 59 per cent. of 190 examined at Mount Selinda (S. Rhodesia, Lat. 20° S. and close to the border of Portuguese E. Africa), 65 per cent. of 100 at Chikore 18 miles from Selinda, and 27·5 per cent. at Gogoyo in Portuguese East Africa, 40 miles from Mount Selinda. No Ternidens were found in local Cercopithecus or baboon, nor was infection produced in a young baboon by feeding it with infective larvae. Expulsion of worms from persons in whom the eggs were detected was aimed at by administration of carbon tetrachloride or tetrachlorethylene in doses of 3 to 5 cc. with or without 1 cc. of oil of chenopodium. From 15 cases in which the Ternidens passed were counted, an average of 17 worms was passed, the maximum being 103 at Chikore, and in no case were signs of disease detected. Whether recovered after treatment or at autopsy the worms always contained blood. They inhabit the large intestine. A few autopsies, carried out in trying and unsatisfactory circumstances, revealed no acute or extensive pathology, and in only one case were large cystic nodules found. No lowering of haemoglobin was detected in any case.

C. L.

Faust (Ernest Carroll). **Human Strongyloidiasis in Panama.**—*Amer. Jl. Hyg.* 1931. July. Vol. 14. No. 1. pp. 203–211. With 2 figs. [11 refs.]

In addition to the conclusions reached in an earlier report (this *Bulletin*, Vol. 28, p. 689) some striking results have been obtained with gentian violet, one grain three times a day in "enteric-coated" tablets. The infection then becomes of the direct type only, while in investigations on monkeys the female worms, it is noted, are killed *in situ* and evacuated in the faeces, the viability of already hatched larvae being unaffected.

C. L.

Faust (Ernest Carroll). **Infection Experiments in Monkeys with Human, Macaque and Ateles Strains of Strongyloides.**—*Proc. Soc. Experim. Biol. & Med.* 1931. June. Vol. 28. No. 9. pp. 919–920. [Dept. of Trop. Med., Tulane Univ., New Orleans.]

"The evidence obtained from this series of experiments points to the conclusion that the *rhesus* and *red-spider* strains of Strongyloides are physiologically different species: they are easily inoculable into their natural hosts from which they were obtained, but they are unable to establish intestinal infections in the reciprocal hosts, although there is some evidence that they migrate through the tissues of the inappropriate host. The human strain can be established but is not able to maintain itself in the red spider monkey; in the rhesus monkey it appears to be completely abortive."

C. L.

Fróes (Heitor P.). **Some Points of Interest in the Biology of** *Strongyloides stercoralis.*—*Jl. Trop. Med. & Hyg.* 1931. Aug. 1. Vol. 34. No. 15. pp. 238–239. With 1 text fig. [8 refs.]

Fróes, reverting to a case already reported (this *Bulletin*, Vol. 27, p. 468) has a useful note, with references to the finding of larvae in the circulating blood, urine, sputum and vomit.

C. L.

McCoy (O. R.). **Immunity of Rats to Reinfection with** *Trichinella spiralis.*—*Amer. Jl. Hyg.* 1931. Sept. Vol. 14. No. 2. pp. 484–494. [3 refs.] [School of Med. & Dentistry, Univ., Rochester, N.Y.]

Larvae in rats were enumerated by dilution after being obtained by digestion as follows. The digesting fluid contained 0·5 per cent. of hydrochloric acid and 1 per cent. of pepsin, which while destroying non-encysted larvae is believed not to incommode encysted ones; that is those 28 or more days old. The animal was skinned and eviscerated, the carcase put through a mincing machine, and added to the digesting fluid in the proportion of 40 gm. to the litre. The brew was left at 37° C. for 3 to 5 hours while a mechanical stirrer was in constant action, and was then strained into a funnel; the clamp on the rubber tube below was opened an hour later, and 100 to 200 cc. of larva-containing fluid drawn off. After washing the larvae several times, an evened suspension of them was several times sampled by spreading 0·075 cc. in a thin line along a slide and counting the larvae: a known number of larvae so determined was then injected by tube into the stomachs of rats at weekly intervals, the actual numbers being two feedings of each denomination of 500, 1,000, 2,000, 4,000, and 8,000, or a total of 31,000

larvae. Eleven such rats and eleven controls from the same two batches (3 and 8 from each respectively) were then fed three weeks later at one intubation with a test dose of 70 larvae per gram, implying 12,000 to 23,000 larvae to each rat. Of the 11 controls 9 died, while two survived and took two months to recover from a very grave illness. All but one of the 11 previously infected rats survived, the exception dying on the 5th day from extensive thrombosis of the mesenteric veins. To three of these last-mentioned surviving rats a second test dose of the same size was given and they were killed in 3 to 4 days to determine to what extent the adult worms developed in the intestine; it proved to be 0·04, 0·05 and 2·8 per cent. To three hitherto uninfected controls the same doses were given and the percentage of adults found in the intestine in 3, 4 and 15 days was 35, 28·7 and 35·2. Moreover from the muscles of the previously infected rats which survived the first test dose there were recovered 8,400, 1,950, and 1,750 larvae; these figures are in contrast to those of the two control rats out of 11, which survived the first test feeding and received no other; for on killing them their muscles yielded 570,000 and 535,000 larvae, while a third member of that batch which died on the 32nd day showed 1,527,000. Other shorter experiments point to the same acquisition of immunity.

C. L.

Hickling (R. A.). **Oedema round the Eyes caused by** *Trichina spiralis.*—*Brit. Med. Jl.* 1931. Oct. 10. p. 654. With 1 chart in text.

Periocular oedema without albuminuria or raised blood pressure and with normal fundi caused a provisional diagnosis of trichinosis. There was no eosinophilia. Four days after the appearance of oedema a nine days fever began with vomiting twice. Eosinophilia was present on the eleventh day of illness and on the 16th day excision of a piece of trapezius muscle showed encysted larvae of *Trichinella spiralis*. The woman, aged 25, lived in London and had never been abroad.

C. L.

Brulé. Deux cas d'ictère hémolytique à trichocéphales. [**Two Cases of Haemolytic Icterus with Presence of Trichuris.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1931. June 8. Year 47. 3rd Ser. No. 19. pp. 960–965.

Two cases are reported. One had in seven years 5 acute attacks of anaemia with subicteric tinge. Many trichuris eggs were found, and 6 gm. [grains 90] of thymol given every 3 weeks left a few only after 4 months of treatments. Anthelmintic and iron treatments were continued, and he is now well, 9 years later, though the presence or absence of trichuris seems unknown. The other patient too had many trichuris eggs, was treated with liver and twice with two treatments of 1·5 cc. of oil of chenopodium. After this no eggs were found, but since there were relapses of his general condition chenopodium was repeated. A slight urobilinuria persists.

C. L.

Shorb (Doys Andrew). **Experimental Infestation of White Rats with** *Hepaticola hepatica.*—*Jl. Parasitology.* 1931. Mar. Vol. 17. No. 3. pp. 151–154. [8 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

"Of seventy-one wild rats obtained in and around Baltimore, 47·9 per cent. were infected with *H. hepatica*. Six white rats fed on the infected

livers of these wild rats did not develop the infestation, but the eggs passed through the intestine unchanged. These eggs were recovered from the feces and became embryonated in twenty-five to forty-two days at 30° C. Fifteen white rats became infected when fed on these embryonated eggs, while eggs in pieces of the rats' livers but not passed through an animal, were developed only to the early morula stage in forty-two days. Eggs from infected livers fed to a cat also developed vermiform embryos in thirty days."

C. L.

MACARTHUR (W. P.). **Pruritus Ani.**—*Brit. Med. Jl.* 1931. Aug. 22. pp. 334–336.

It is not possible to condense this tightly-packed mass of information on a most irritating subject. Here is one point only. The treatment advised is the injection of 4 ounces of salt solution with a strength of two tablespoonfuls to the pint, which must be self administered since it is useless unless given when there is itching, that is shortly after going to bed when the female worms come down to the anus to oviposit. " When a sufferer who has been wakened nightly for months or years finds that a simple procedure completed within a very few minutes will protect him from the tortures of pruritus, at once his whole outlook on life is altered," and such pruritus has been ended by the capture of a single worm. A pharisaical scrupulosity in washing is an added guard against reinfection.

C. L.

PETROVYCH (A.). Zur Frage ueber einige Ursachen der Invasion und Reinvasion bei Enterobiosis. [**On the Causes of Invasion and Re-invasion by Thread Worms.**]—*Muench. Med. Woch.* 1931. Apr. 17. Vol. 78. No. 16. pp. 663–664. [6 refs.]

It is concluded that for a diagnosis of oxyuris infection, there must be examined not only scrapings from perianal fissures and from beneath the nails, but also the duodenum ; that the possibility of air convection must be dealt with by cleansing the bowel, the wearing of closed up night clothes and treatment of throat and nose ; and that diffusion through communities must be prevented by close search for carriers.

C. L.

HOFFMAN (W. A.). **Gapeworm in Man.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. June. Vol. 6. No. 4. pp. 381–383. With 1 plate. [9 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

This comprises the fourth case of Syngamus infection in man, first described by LEIPER in 1913 ; the parasite was finally identified by him as probably being *S. laryngeus* (this *Bulletin*, Vol. 22, p. 94), a widespread parasite of ruminants. In this case a more or less continuous cough coming on several weeks after visiting a farm led to the seeing of a red object on the posterior wall of the pharynx and its removal by forceps, when it proved to be a pair of worms *in copula*.

C. L.

Espié (A.). Note complémentaire sur un nouveau parasite intestinal humain de la Tunisie. [**Further Note on a New Human Intestinal Parasite in Tunisia.**]—*Arch. Inst. Pasteur de Tunis.* 1931. Apr. Vol. 20. No. 1. pp. 73–76. [1 ref.]

Espié returns to his previous report (this *Bulletin*, Vol. 24, p. 190). The technique is merely described as concentration after disintegration. Eggs corresponding to the trichostrongylus character were found in 123 of 1,100 examinations of different persons, but only in 15 were they unaccompanied by other helminth eggs. They were not, it is pointed out, eggs of Heterodera or Tyroglyphus. No adults were ever recovered. Culture was carried through in plain faeces till eggs became embryonated, after which the material was described as having reached its limit of preservation.

C. L.

Nishimura (Fukutaro). **On the Histological Changes in the Tissues of the Final Host, caused by the Progressive Development of** *Gongylonema orientalis.*—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1931. June. Vol. 30. No. 6 (315). pp. 633–646. With 16 figs. on 2 plates. [127 refs.] [In Japanese. English summary pp. 46–48.]

The author reaches these conclusions :

" The presence of the live parasite produces three different reactions in the surrounding tissues : (1) The circumstance that the parasite lives completely embedded in the epithelial stratum insures the thorough distribution of its secretions and excretions throughout the mucosa, and also causes injuries of a mechanical nature, and thus stimulates the regenerative proliferation of the epithelium. (2) The metabolic products of the parasite and especially the secretion of the cervical gland cause engorgement of the viscus and inflammation of the mucosa, and thus stimulate proliferation of the connective tissue. (3) The secretion of the cephalic gland of the female stimulates proliferation of the mucosa epithelium and is the agent for canceration."

C. L.

Fülleborn (F.). Eine seit 24 Jahren an der Vorderseite einer Hand umherwandernde Hautaffektion aus Ostafrika. [**A Wandering Eruption on the Hand of 24 Years Duration.**]—*Dermat. Woch.* 1931. July 18. Vol. 93. No. 29. pp. 1163–1167. With 4 text figs. [7 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Continuing his account of this curious case (this *Bulletin*, Vol. 24, p. 450), Fülleborn illustrates the points on the hand where this eruption has appeared during 1929 and 1930. He holds as before that it is probably caused by a wandering nematode larva. It has persisted for 24 years.

C. L.

Grace (A. W.) & Grace (Feiga Berman). **Researches in British Guiana 1926–1928 on the Bacterial Complications of Filariasis and the Endemic Nephritis, with a Chapter on Epidemic Abscess and Cellulitis in St. Kitts, British West Indies.**—No. 3 of the *Memoir Series of the London School of Hygiene & Tropical Medicine.* 1931. Mar. pp. viii+75. With 4 text figs. & 2 charts. [28 refs.] London : School of Hygiene & Tropical Medicine, Keppel Street, Gower Street, W.C.1. [8s.]

In this monograph on the bacterial complications of filariasis there are matters of helminthological interest. It is noted that in filariasis

the lymphangitic attacks have a common character; that when repeated in the same patient they usually arise in the same situation; that when in the cases observed an abscess resulted from lymphangitis the β haemolytic streptococcus was recovered from this in 26 of 27 cases, that in 5 of these 26 cases the same micro-organism was recovered from the blood, was the only one so recovered, and was present also in one case of "abdominal filariasis"; and that *F. bancrofti* has not been shown capable of producing lymphangitis. Passing to elephantiasis, this condition may begin apart from lymphangitis in about 10 per cent. of cases; it may follow simple lymphangitis, but most commonly it follows abscess usually of unknown origin and less usually traumatic.

Of 1,000 in-patients at the Georgetown hospital 23·1 per cent. showed *Mf. bancrofti* in blood drawn between 8 p.m. and midnight, for those over 10 years of age the percentage was 25, for those under 10 it was 6·4, for East Indians 14·3, for those with elephantiasis 14·9. Percentages of some other manifestations were: enlarged glands along Poupart's ligament 54·2, in Scarpa's triangle 26·3, epitrochlear 16·8, axillary 15·3, elephantiasis 11·4, hydrocele 12·3 of males, abscess 1·1, chyluria 0·4, enlarged lymph trunks 0, lymphangiovarix of scrotum 0, chylocele 0. In children under 10, not only is the microfilaria rate low but streptoccocal lymphangitis and abscess are rare, but in East Indians the low microfilaria rate is combined with a streptococcus rate as high as that of other races. Moreover there is no relation between the presence of embryos in the blood and a positive reaction to streptococcus toxin.

Two points are further discussed: (1) hard painful lumps of walnut size are found along lymphatic trunks and associated with lymphangitis [apparently the "focal spots" of O'Connor, Golden and Auchincloss, this *Bulletin*, Vol. 27, p. 986] and are explained as due to aggregations of streptococci; (2) these disappear as elephantiasis supervenes, which occurs uniformly about two years after the initial happening, and the process is explained as the substitution, for the aggregations, of an innumerable number of minute foci, each containing a few organisms. "There is no direct evidence of the part played by *Filaria bancrofti* in the origin of elephantiasis in British Guiana." In those in whom lymphangitic attacks have failed for a year or more the microfilaria rate is half that shown by those still experiencing these attacks.

"Three therapeutic agents were investigated, viz., a eucalyptus and bicarbonate mixture, mercurochrome—220—soluble, and antistreptococcal serum. The mixture was of no value and the mercurochrome little better. There is some evidence to show that antistreptococcal serum has a place in the treatment of lymphangitis."

C. L.

McKinley (Earl B.). **The Role of Bacteria in Acute Filarial Lymphangitis.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. June. Vol. 6. No. 4. pp. 419–427. [9 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

After pointing out that from work done by others there is abundant evidence that bacterial infection may complicate filarial disease,

McKinley asks "Can we have acute filarial lymphangitis *without* bacterial infection" and if so how? He has studied 47 cases selected by O'Connor or Suarez, of which 9 were deliberately included as non-filarial controls. The author's own summary is as follows:—

"Thirty-eight cases of acute filarial lymphangitis have been studied bacteriologically under the most careful conditions of asepsis. Blood cultures have been uniformly negative. Cultures from focal areas of pain and inflammation by aspiration in twenty-seven cases have been negative. In cultures prepared from skin removed from the inflamed areas of eleven cases one culture was positive for a green-producing streptococcus, another showed a hemolytic staphylococcus aureus and a third was contaminated with a gram-positive bacillus. In no case was a *Streptococcus hemolyticus* cultivated. In nine control cases, simulating acute filarial lymphangitis in some respects but definitely diagnosed as septic, the *Streptococcus hemolyticus* was isolated in seven and *Staphylococcus aureus hemolyticus* was cultured in two cases.

"We believe that the almost uniform absence of positive cultures in this series of cases of acute filarial lymphangitis, studied under such rigid aseptic technique, indicates that bacterial invasion does not always or even generally account for the acute manifestations of this condition. The results suggest that there may exist at least three types of acute lymphangitis: (1) lymphangitis of bacterial origin, (2) lymphangitis of filarial origin and (3) filarial lymphangitis with secondary bacterial infection. The epidemiological, histological and bacteriological evidence suggests that acute filarial lymphangitis may commonly exist as a disease entity without a complicating secondary bacterial infection. It becomes then a clinical problem to differentiate these conditions one from the other. The mechanism by which the filarial process produces these acute attacks of lymphangitis without the intervention of other infections is still unknown. The periodicity of recurrent attacks in many cases is suggestive that the phenomenon is in some way related to the life cycle of the parasite in the human host, but this is mere speculation. Toxins of living, dying or dead worms, allergic phenomena or periodic invasion of worms into new and unprotected tissue (by fibrotic changes) where toxic products of the worms may be absorbed by the body have all been suggested. The problem still remains unsolved and requires further investigation."

C. L.

Low (G. Carmichael). **Some Points in the Pathology of Filariasis: *Filaria bancrofti*, *Loa loa* and *Onchocerca volvulus* Infections.**—*Jl. State Med.* 1931. Oct. Vol. 39. No. 10. pp. 594–598. [11 refs.]

Dealing in a paper read at the Frankfurt Congress with *F. bancrofti* infections, Low first concurs with Acton and Rao [this *Bulletin*, Vol. 28, p. 682] and suggests that all tropical workers who have a personal knowledge of the subject, now agree that the lesions produced by *F. bancrofti* are in part caused by toxins given off from the worms plus superimposed bacterial infection. He gives instances other than those cited by Lane of the finding shortly after death of preponderating numbers of microfilariae in the blood of the heart and thoracic viscera of man and animals. He holds that there is no doubt about there being a seat of special selection for such microfilariae in the blood of the thoracic viscera.

C. L.

Tampi (M. K.). **A Study of Filariasis in Porto Rico.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. June. Vol. 6. No. 4. pp. 435–441. [School of Trop. Med., Univ. of Porto Rico, San Juan, & School of Hyg. & Public Health, Johns Hopkins Univ., Baltimore.]

Of 518 persons examined at Santurce, Porto Rico, 7·7 per cent. showed *Mf. bancrofti*. Only *Culex quinquefasciatus* (*fatigans*) was found infected, in 5·4 per cent. of 543 specimens. The highest microfilaria rate was 9·5 in the Boys' Charity School, the rate increasing with length of residence ; and here the percentage of infected Culex was 7·4, and there existed excellent local arrangements round it for their free breeding. The localization of filarial endemicity in the island is stressed, but the suffering, incapacity, lowered vitality and serious economic loss it causes are pointed out.

C. L.

Feng (Lan-Chou). *Anopheles hyrcanus* var. *sinensis* **Wied., Transmittor of** *Wuchereria* (*Filaria*) *bancrofti* **in Woosung District, Shanghai, China.**—*Amer. Jl. Hyg.* 1931. Sept. Vol. 14. No. 2. pp. 502–514. With 13 figs. on 1 plate & 1 map. [13 refs.] [Peiping Union Med. College, Peking.]

In and about Woosung filariasis and elephantiasis are common. Of wild *Anopheles hyrcanus sinensis* 16 per cent. contained filarial larvae, while in 16 per cent. of the infected mosquitoes the larvae were infective ; this is the mosquito found commonly in the villages. Of wild *Culex pipiens pallens* 13 per cent. harboured filarial larvae but none were in the infective stage ; it is essentially a pest of the town. In the villages the dwelling places of 33 per cent. of families harboured filarially infected mosquitoes and in the town 9 per cent. The evidence, then, is that *A. hyrcanus sinensis* is a good and presumably the main carrier here and probably throughout the Yangtze valley. Only young larvae have been found in *Culex tritaeniorrhynchus*, *Armigeres obturbans* and *Aedes albopictus*.

C. L.

Brug (S. L.). Filariasis in Nederlandsch-Indië, III.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Mar. 1. Vol. 71. No. 3. pp. 210–239. With 3 charts (2 on folding plates). English summary p. 240. [30 refs.]

——. **Filariasis in the Dutch East Indies.**—*Proc. Roy. Soc. Med.* 1931. Apr. Vol. 24. No. 6. pp. 663–673 (Sect. Trop. Dis. & Parasit. pp. 23–33). With 4 figs., 1 diagram & 1 map. [15 refs.] [Med. Lab., Batavia, Java.]

These papers cover much the same ground and follow up previous publications (this *Bulletin*, Vol. 26, p. 546). The distributions of *Mf. bancrofti* and *Mf. malayi* in the Dutch East Indies are traced, but it is particularly noted that where mixed infections occurred they were not proportionate to the number of single infections : thus, in Moekoe Saki, of 115 persons examined 64 had no infection, 46 harboured *Mf. bancrofti* only and 5 harboured both microfilariae ; there was no pure infection with *Mf. malayi*. It is held that this discrepancy cannot be explained by supposing that they are two forms of the same

species for if so the new form would have been noted before, and it is concluded that individual hosts must have varying immunity to the two species.

Regarding the larval host, in a certain locality 47 per cent. of the population harboured *Mf. malayi* but *Culex fatigans* was absent from thousands of mosquitoes caught in houses there. Five catchers were kept fully occupied in capturing during one evening the hundreds of mosquitoes which fed on a single heavily infected patient. During the next 10 to 15 days about 90 per cent. of these mosquitoes died. *Taeniorhynchus* (*Mansonioides*) *annulatus* and *T.* (*M.*) *annulipes* were by far the commonest local mosquitoes, while in addition the survival of filariae occurred practically only in them, though a few survived in *T.* (*M.*) *uniformis* and *T.* (*M.*) *annuliferus*. Of mosquitoes caught in houses, only the two first-named species were found infected—to 1·9 and 1·2 per cent. "The prevalence of mosquitoes is great enough to explain why half the population was infected. It would be far more difficult to explain why the other half was not." In spite of their overwhelming numbers, their breeding places were not discovered in a 14 days' search. In the mosquito, development of *F. malayi* closely follows the lines described for *F. bancrofti* except perhaps in two features. In the sausage stage, which lasts about 5 days the tail with its scattered nuclei is usually preserved; in the 7 to 10 days' stage, a nail-like structure fills the anus.

Periodicity of *Mf. malayi* was in the mean between 1 to 15 and 1 to 20, taking noon and night numbers, as compared with more than 1 to 100 for *Mf. bancrofti*. It was reversed in a night worker. In New Guinea, cases of non-periodic infection with *Mf. bancrofti* were found. With *Mf. malayi* infection, elephantiasis occurred mainly in the limbs and those with elephantiasis showed microfilariae more often than those without. With *Mf. bancrofti* infection, the genitalia were mainly infected. Brug adds, "the atypical form of mf. malayi of Korke is the same as my mf. malayi."

C. L.

LANE (Clayton). **The Mechanism of Microfilarial Periodicity.**—*Lancet*. 1931. May 16. pp. 1100–1101. [6 refs.]

In a former paper (this *Bulletin*, Vol. 26, p. 981) the writer, by exclusion of other possible causes, was led to conclude that the mechanism of microfilarial periodicity could reasonably be explained only by cyclical parturition of female worms and daily death of embryos. Fresh work seeming to justify a return to the matter, he now first explains that by mechanism he meant mechanism—the mechanical means by which periodicity is produced. The stimulus which sets the mechanism in motion was and is deliberately excluded from consideration. He deals with the statement by MANSON-BAHR (*loc. cit.*) that in the periodic form of infection by *F. bancrofti* the adults maintain a central, in the non-periodic a peripheral, habitat, and with certain difficulties raised by that critic. Lane points out how the work of O'CONNOR, GOLDEN, and AUCHINCLOSS has since shown (this *Bulletin*, Vol. 27, p. 986), first that the former statement can no longer be accepted, since worms may be widely scattered in the limbs in this form of filariasis, and second that the number of fecund and mature *F. bancrofti* present in a filariated individual may far exceed the suggested figure of 20, as follows from

the fact that they have now been found in large numbers in habitats whose search has hitherto been neglected, namely the lymphatics of the limbs. Accordingly the calculated daily fecundity of individual female worms must be far lower than the huge figure to which MANSON-BAHR's figures led him. He quotes MANSON-BAHR's experience that microfilariae are usually dead in chylous urine, but alive at night in haemochylous urine, and points out that it suggests, or implies, that urine itself is not deadly to them but that they are usually dead in it because their life span has so often been passed before they reach it through tortuous blocked lymphatics. What, he asks, is the usual finding here? He cites the new evidence produced by O'CONNOR (this *Bulletin*, Vol. 28, p. 681), for cyclical parturition, as well as a second case privately communicated in which O'CONNOR found in Porto Rico, where nocturnal periodicity holds, four fully developed gravid female worms all at the same stage of parturition. He further asks whether this is normal in lands where periodicity is present and abnormal where it is absent. Finally he points out that with adults of this species so common in parts of the body distal to all lymph glands, the destruction of microfilariae in the glands implicated, and the fibrosis which presumably follows, must in future be considered in any attempt to explain this production of elephantiasis in filarial infection.

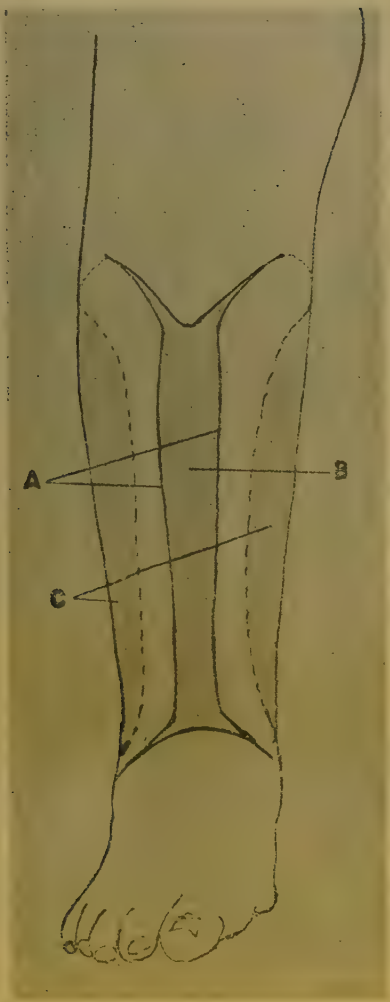
C. L.

i. AUCHINCLOSS (Hugh). **A New Operation for Elephantiasis.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1930. Dec. Vol. 6. No. 2. pp. 149–150. With 4 plates. [College of Physicians & Surgeons, Columbia Univ., New York City.]

ii. TORGERSON (William R.). **Preliminary Report on the Auchincloss Operation for Elephantiasis.**—*Ibid.* 1931. June. Vol. 6. No. 4. pp. 411–418. With 22 figs. on 15 plates. [6 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

iii. DEL TORO (Jorge), PONS (Juan A.) & RODRÍGUEZ MOLINA (R.). **Case Report on Twelve Auchincloss or Modified Auchincloss Operations for Filariasis. Preliminary Report.**—*Ibid.* 1931. Sept. Vol. 7. No. 1. pp. 3–10. With 18 plates. [2 refs.] [Univ. Hosp., School of Trop. Med., Univ. of Porto Rico, San Juan.]

i. The Auchincloss operation is intended to lighten elephantoid legs, and to remove those tender focal spots whence start the inflammatory lesions of filarial fever and as many calcified worms as possible. It consists in two incisions marking out a vertical strip of skin. From its ends V-shaped incisions are made diverging upwards at the upper end and downwards at the lower. "An almost dangerously wide amount of skin was then undermined with considerable care just deep to what might be considered the corium . . . over one half—nearly two-thirds—of the . . . leg was thus exposed. Except for the annular ligament of the ankle, the fascia covering the bone and the muscles was then removed with the subcutaneous tissue and the strip of skin *en masse*." With the leg elevated the skin was approximated with care. In this case it nowhere sloughed. Figures show a diagram of the operation, photos of the legs before and after, and an X-ray photo of the excised skin in which a surprisingly larger number of



Scheme of the Auchincloss operation for elephantiasis.

A. Incisions. B. Skin excised. C. To show extent of subcutaneous tissue and deep fascial excision posteriorly. This type of incision has been used posteriorly and is applicable to either side, but, as yet, experience has not demonstrated which, if any, is preferable. It has, so far, been placed so as to remove the maximum number of areas of demonstrable calcification. It may be found necessary to use more than one incision in more than one operative stage.

[Reproduced from the *Porto Rico Journal of Public Health and Tropical Medicine.*]

calcified shadows was demonstrated than was shown in the leg before operation. This description applies to an operation where the vertical strip of skin removed was anterior, but it is contemplated that it should be situated where it will remove the largest number of calcified filariae as indicated by X-rays.

ii. Torgersøn, reporting on 5 cases of the Auchincloss operation, notes that 3 or 4 years must pass before its value can be settled. Results have been best where fibrosis has been greatest giving an X-ray density of plus-three or plus-four; the patient should be in bed for at least ten days before operation and there must be no ulceration of the skin—for in one case in which an ulcer was cut out, with great care and separate instruments, there was yet necrosis which involved a considerable area of skin and also the tibialis anticus tendon. He is convinced that the flaps are in no danger provided a fourth to three-eighths of an inch of subcutaneous tissue is left with the skin.

iii. The Kondoleon operation, it is pointed out, aims at draining the superficial lymphatics through the deep ones by leaving an open vent in the deep fascia, while the Auchincloss operation aims also at correcting deformity and removing adult filariae. As regards surgical details, great stress is laid on preliminary scrubbing and cleansing, and a prolonged period of rest before operation. During it, there are advised general anaesthesia, the tourniquet, suspension of the leg about 2 feet above the level of the operating table, the leaving of some subcutaneous fat adherent to the skin when marked fibrosis is not found near the latter, the leaving of strips of deep fascia to support the muscles, the lengthening of the vertical incision rather than the making of the oblique terminal ones of Auchincloss, and the excising of skin a short distance only ahead of the suturing, thus " fitting the new stocking to measure." Twelve cases are described in detail. Sometimes cosmetic results have been excellent, sometimes less so, and sometimes swelling about the ankle has increased. In two cases there have been attacks of lymphangitis since the operation. The pathological lesions in the excised tissues have included in certain cases arterial sclerosis, thickening of the intima of small vessels to an extent which may occlude them, calcification of microfilariae, hypertrophy of wall of lymphatics. " It is too early to draw any conclusions on the results of the surgical treatment. . . . In the majority of cases treated by operation good results are late in coming."

[There is no mention in any of these papers of any immediate or late effects of that wide destruction of sensory nerves which must surely occur.]

C. L.

Romiti (Cesare). Contributo al trattamento chirurgico della elefantiasi dello scroto. (Con la descrizione della tecnica personale di resezione plastica adottata.) [**Surgical Treatment of Elephantiasis of the Scrotum.**]—Reprinted from *Rassegna Internazionale di Clin. e Terapia.* 1930. 24 pp. With 3 text figs. & 24 figs. on 2 folding plates. [10 refs.] English summary.

The author describes with a certain amount of detail and discusses the recognized methods of treatment of elephantiasis of the scrotum,

both operative and non-surgical. Among the latter he mentions injections of silver, arsenic, copper, mercury and antimony preparations to kill the filaria, and the use of vaccines and of fibrolysin; the former he divides into those aiming at lymph-drainage and those of excision and of a plastic nature. He next discusses the pathogeny of the condition which in his view is not a nosological entity *per se* but is largely secondary to pathological changes in the spermatic cord and epididymis, which are primarily affected. The testicle and the vas deferens are not subject to these lesions. The early manifestations consist, he states, of oedema of the ligamentum testis secondary to venous and lymph stasis of the vessels of the pampiniform plexus. In a great majority of cases the result of this is the formation of a hydrocele with a thickening of the tunica vaginalis and oedema of the areolar tissue of the cord. In support of this theory is the fact that the author has found in the lymphatic dilatations of the plexus of the cord, in the epididymis and in the hydrocele fluid living filariae and embryos. In further confirmation he states that in women elephantiasis of the labia majora is very exceptional (he himself has never seen a case) while at operations of laparotomy in the lower quadrant for various reasons he has frequently observed varicocele of the ovarian veins, dilatation of the ovarian lymphatics and oedema of the ovarian and broad ligaments. The technique of his own method of operation is then described, the removal *en bloc* of the diseased tissue followed by a plastic for the scrotum. The details cannot be given here, but the article is furnished with schematic drawings showing the incisions he makes and there are photographs of patients showing the condition before and after treatment. Brief notes are given of eight cases.

H. H. S.

Aubin & Nadessin. Traitement des lymphangites et des éléphantiasis par les injections de lipovaccin anti-streptococcique. [**Treatment of Lymphangitis and Elephantiasis by Injections of Anti-streptococcus Lipovaccine.**]—*Rev. Méd. et Hyg. Trop.* 1931. Mar.–Apr. Vol. 23. No. 2. pp. 91–99.

The cases number 16. It is claimed that a course of these injections produced rapid and complete betterment of lymphangitis, with fewer and less severe relapses, whether the condition was associated with filariasis or not. There has also been some shrinking of elephantoid swelling, and cessation of an existing lymphorrhoea.

C. L.

Jantzen (Walther). **Microfilaria Nocturna—Case Report.**—*Nineteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1930. p. 110. [Truxillo Railroad Company Hosp., Puerto Castilla, Honduras.]

A typical periodic case showing many microfilariae, especially between midnight and 4 a.m.; admitted for an accident; microfilariae discovered by routine examination; the man having no symptoms: the case being the first locally detected in a 6 years search. He had lived in Nicaragua and Costa Rica and had visited Panama.

C. L.

STRONG (Richard P.). **Onchocerca Investigations in Guatemala. Report of Progress of the Harvard Expedition.**—*New England Jl. of Med.* 1931. Apr. 30. Vol. 204. No. 18. pp. 916–920. [Dept. of Trop. Med., Harvard Univ., & Med. Dept., United Fruit Co., Boston.]

At Santa Emilia, Guatemala, 54 per cent. of inhabitants are infected with *O. caecutiens*, the tumours nearly always being situated on the head, usually on the scalp, measuring in millimetres 6 to 20, rarely as much as 30 and once 50. The last was close to the anterior superior iliac spine, so in both size and habitat resembled the tumour of *O. volvulus*. In the scalp the tumours may cup the skull. From them adults have been obtained entire by digesting the tissue with papaya juice or papaine in 0·2 per cent. hydrochloric acid. Microscopic examination of sections of eyes removed at autopsy and at operation suggests that the local lesions are at least partly due to the continued passage of large numbers of microfilariae through the lymph channels, and to the resulting oedema and perivascular infiltration. Eosinophilia in the blood lay between 25 and 50. Three species of *Eusimulium* are implicated, provisionally identified as *Eu. avidum*, *Eu. ochraceum* and *Eu. mooseri*. They take 3 to 5 minutes to fill themselves and in the process seem to have the power of attracting the microfilariae. For example, in one fly allowed to bite the face many more microfilariae are found than on direct examination of the skin; where section of the skin of the face has shown no microfilariae, a second section made through or near the spot where a fly has just bitten may show over 100. Although the larvae are most abundant on the head they may be found in every part of the body, even the toes, particularly if diagnosis is by the concentrative technique of examining an Eusimulium which has bitten there. In the fly general development is on the lines of *F. bancrofti*; the larvae are at first even more active than in the skin; as they broaden their movements become more stately, but when infective and measuring 0·45 to 1·14 mm. they move actively and even violently. Of 1,658 Eusimulium caught at random, about 5 per cent. were infected, and infective larvae have been surprised and preserved emerging from the labium. In diagnosis by skin reaction and precipitin some success is claimed, but details are not given. In prevention, removal of the tumours is advised, though it is noted that this does involve disappearance of microfilariae; but since the breeding places of Eusimulium are widely distributed in every running stream "the eradication of these flies in such coffee districts is entirely impracticable."

C. L.

STRONG (Richard P.). **Onchocerciasis in Guatemala.**—Reprinted from *Science*. 1931. May 29. Vol. 73. No. 1900. pp. 593–594.

In vitro plasmoquinin [? plasmochin] in dilution of 1 in 10,000 effectively destroys all microfilariae within 20 minutes, and nearly all in 30 seconds. Quinine in 1 in 5,000 solution produces somewhat similar results; neosalvarsan and mercurochrome were relatively ineffective; a serum obtained from a rabbit after repeated inoculations with extracts of microfilariae, adults, and whole tumours, was not filaricidal.

C. L.

Fülleborn (F.). Ueber juckende Hauterscheinungen bei zwei deutschen Onchocerca-Trägern aus Südmexiko. Nebst einer Zusammenfassung über die auf Onchocerca-Infektion bezogenen Dermatosen und Versuche über den diagnostischen Wert der Cutanreaktion mit Onchocerca-Antigen. [**Pruritus in Two German Onchocerca Carriers from S. Mexico.**]—*Arch. f. Dermat. u. Syph.* 1931. Sept. 23. Vol. 164. No. 1. pp. 216–238. With 15 text figs. [1 page of refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

There are described two cases in Germans of *O. caecutiens* infection from Mexico. They both had an itching skin and one had xerodermia, conditions not hitherto associated with the Central American infection, though as regards the African some writers uphold its commonness while other deny its existence. The histological condition of excised skin in the one case, that with apparently normal skin, was practically normal, the skin too containing few microfilariae ; the xerodermia skin not only showed considerably larger numbers of microfilariae but a marked perivascular infiltration, though neither was so obvious as in the skin of an Indian boy brought over to Europe from Guatemala. An antigen prepared by drying a nodule excised from one of these patients gave typical wheals, not only with them but also with onchocerca-free controls sensitive to ascaris and strongyloides antigens.

C. L.

Hissette. Sur l'existence d'affections oculaires importantes d'origine filarienne dans certains territoires du Congo. [**Eye Diseases of Filarial Origin in Belgian Congo.**]—*Ann. Soc. Belge de Méd. Trop.* 1931. Mar. 31. Vol. 11. No. 1. pp. 45–46.

The territories are situated astride the Sankuru-Lubilash river in a region where 20 per cent. of onchocerca cases are blind and 50 per cent. of the population suffers from eye troubles. The disease differs from onchocerciasis as generally described by the large number of cysts, their size, and their very frequent but not exclusive localization on the head. There is, however, absence of erysipelas-like symptoms. Removal of the nodule has ameliorated ocular symptoms, and it is noted as curious that the natives are convinced that it is spread by Simulium. This is a preliminary report.

C. L.

Rodhain (J.) & Dubois (A.). Observations de cas de parasitisme par *Onchocerca volvulus* chez l'Européen. Réactions cutanées. Allergie dans la filariose volvulus et la filariose loa. [**Cases of Parasitism by *O. volvulus* in Europeans. Skin Reactions—Allergy.**]—*Rev. Belge Sci. Méd.* Louvain. 1931. May. Vol. 3. No. 5. pp. 613–623. With 3 text figs. [10 refs.]

The authors report from the School of Tropical Medicine, Brussels, the cases of 8 Europeans who had lived in the Belgian Congo, 4 new. Diagnosis was always confirmed by puncture of a lymph gland or extirpation of a nodule. Xeroderma or ichthyosis has not been seen, but four cases showed chronic prurigo with papules, excoriation and some lichenization. Elephantiasis was not seen. Skin sensitiveness occurring in 50 per cent. of cases raised the question of sensitization ;

and this has been tested against antigens obtained from *O. volvulus*, *L. loa*, ascaris, and bacteriological peptone and applied by scarification. The antigen was obtained by preserving the worm in *chloroform water*, drying and powdering, and scarifying a portion of the skin on which the powder had been spread. The reaction occurred almost equally well whatever the antigen, but was much more lively in those subject to prurigo; indeed in one person with volvulus but no prurigo there was no reaction.

In an addendum the authors state that they had not read of FAIRLEY'S results with *Dirofilaria immitis* antigen when their paper was written. They point out that their antigens were probably inferior to his, owing to preservation for a variable period in chloroform water before dissection, and also that the scratch test employed by them was probably a less satisfactory technique than intradermal injection. A supply of Dirofilarial antigen had recently been received from FAIRLEY, and they propose to test it on another series of cases in the near future.

C. L.

NORONHA (A. J.). **On the Presence of a Filarial Worm in a Tumour removed from the Left Side of the Nose of a Child.**—*Indian Med. Gaz.* 1931. Oct. Vol. 66. No. 10. pp. 556–560. With 3 text figs.

A baby girl of 6 months had had for 4 months frontonasal tumours, first diagnosed as dermoid cysts, showing inflammation and displacing the eyeballs outwards. Dissection of one was followed by the child's death. Sections of the tumour showed a coiled worm, the uterus filling the entire body cavity and containing sheathed embryos with anterior ends rounded and a taper occupying the posterior sixth. The guineaworm is excluded by its size, by the unsheathed embryos and by their tail-taper occupying a third of the body. The presence of a sheath, it is further pointed out, excludes *Onchocerca volvulus* among other filariae. ACTON, to whom sections were sent, excluded *F. medinensis* and *F. bancrofti*, and pointed out that the lesions resembled those of *O. caecutiens*, and that it was a unique case, probably an indication that India possessed an onchocerca. [Cattle in India suffer from onchocerca nodules.]

C. L.

DÉJOU (L.). Hydarthrose du genou avec présence de microfilaires dans le liquide articulaire. [**Hydarthrosis of the Knee with Microfilariae in the Fluid.**]—*Marseille-Méd.* 1931. Mar. 25. Vol. 68. No. 9. pp. 424–426.

Unsheathed microfilariae, whose size is nowhere stated, were found in nodules of the size of nuts under the skin of the thorax, and in fluid from a left knee joint which had been swollen for about a month. They are, apparently by exclusion and not by their anatomic characters, identified as those of *Onchocerca volvulus*; they occurred in a region (Togo) where *F. bancrofti* is completely unknown but where *F. perstans* and *O. volvulus* are common. Reference is made to 5 cases of acute filarial synovitis reported by MAITLAND (*Indian Med. Gaz.* 1898, Oct.).

C. L.

Mohammed (Abdel Shafi). **Contribution to the Study of the Pathology and Morbid Histology of Human and Bovine Onchocerciasis.**—*Ann. Trop. Med. & Parasit.* 1931. Aug. 13. Vol. 25. No. 2. pp. 215–298. With 11 text figs. [69 refs.] [School of Trop. Med., Liverpool.]

The author summarizes the literature and reports on two tumours, one of *O. volvulus* and the other of *O. gibsoni*. The tumours varied in structure from being purely cellular, mainly endothelial, to being almost purely fibrous. It is suggested that this tissue reaction results in a spreading fibrosis which gradually drags in and imprisons the worm, juxta-articular nodules being possibly old and now uninhabited volvulus tumours. These tissue changes are correlated with those produced by *F. bancrofti*, and by schistosomes and those of infective granulomata ; and must be due to a toxin, which also causes localized thickenings of skin, elephantiasis and enlarged glands. " The affection of the head in South America is explicable on the bionomics of the vector." It is argued from the histological appearances that the eosinophil cell neutralizes helminthic toxins.

C. L.

Ochoterena (I.). Contribución para el conocimiento de la onchocercosis en Mexico. Proceso histologico de formación de los fibromas onchocercosos. [**Onchocerciasis in Mexico. Process of Formation of Fibromata.**]—*An. Inst. Biol. Univ. Nac. Mexico.* 1931. Vol. 2. No. 2. pp. 109–115. With 7 text figs.

This is a description of the histological structure of an onchocerca tumour. The nematode itself is enclosed in a delicate endothelial membrane, probably the lining of a lymphatic vessel. Outside this and also in the interstices of the worm entanglement is a leucocytic infiltration of lymphocytes, polymorphonuclears, eosinophiles and many whose nature is unrecognizable owing to degeneration. In the centre is a viscid liquid and between the worm and the fibrous covering of the tumour is a cellular barrier of varying thickness. These cells are not of leucocytic origin, as some have thought, but are probably fibroblasts ; a few elastic fibres are sometimes present. Around the vessels infiltration with cells of various types—swollen and proliferated endothelial cells, leucocytes, plasma cells and altered fibroblasts—is seen, the character depending on the age of the tumour.

H. H. S.

Rao (M. G. Ramachandra). **Guinea-Worm in a Boy aged 2.**—*Indian Med. Gaz.* 1931. Sept. Vol. 66. No. 9. pp. 504–505. With 2 text figs.

From a scrotal swelling, apart from the left testis and not extending to the inguinal canal, there escaped on incision pus and ten inches of a coiled up guinea worm.

C. L.

TOURNIER (E.). La chimiothérapie de la dracunculose. [**Chemotherapy of Dracontiasis.**]—*Ann. de Méd. et de Pharm. Colon.* 1931. Jan.–Feb.–Mar. Vol. 29. No. 1. pp. 138–147. [22 refs.]

Tournier surveys the literature dealing with treatment of guinea worm infection by arsenic and antimony. He holds that although there have been disappointments, particularly in multiple infections, the effects of the drugs, especially of arsenic, should be studied in detail to determine how best to give them.

C. L.

ANDERSON (Hamilton H.). Anthelmintic Properties of Certain Alkyl Resorcinols.—*California & Western Med.* 1931. Aug. Vol. 35. No. 2. p. 138. [6 refs.]

BONELLI (Pablo). Analogía entre la Schistosomiasis Mansoni y la enfermedad de Banti o anemia esplénica.—*Bol. Asoc. Med. de Puerto Rico.* 1931. July. Vol. 23. No. 190. pp. 251–258. [5 refs.]

BRUG (S. L.). Filariasis in Nederlandsch-Indië.—*Nederl. Tijdschr. v. Geneesk.* 1931. 75th Year. No. 25. pp. 3371–3373.

CAWSTON (F. G.). The Control of Rushes and Water Lilies in Localities infested with the Bilharzia Parasitic Worms.—*Jl. Trop. Med. & Hyg.* 1931. Mar. 16. Vol. 34. No. 6. p. 84. [2 refs.]

VAN CREVELD (S.). Eine besondere Form von Ascaridiasis.—*Klin. Woch.* 1931. July 11. Vol. 10. No. 28. pp. 1306–1309. With 1 text fig. [17 refs.]

HOFFMAN (W. A.). Intestinal Parasiticides.—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. Sept. Vol. 7. No. 1. pp. 51–67. [29 refs.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

KAISER (L.). Ontlasting-onderzoek en worm-eierendichtheid bij de Mandareesche kustbevolking. (Celebes en Onderhoorigheden.)—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. July 1. Vol. 71. No. 7. pp. 714–717.

KELLER (A. E.), CASPARIS (Horton) & LEATHERS (W. S.). A Clinical Study of Ascariasis.—*Jl. Amer. Med. Assoc.* 1931. Aug. 1. Vol. 97. No. 5. pp. 302–306. [6 refs.]

KITAMURA (K.). Experimentelle Beiträge zur Kenntnis des Eindringens der Hakenwurmlarven in die Haut.—*Japanese Jl. Dermat. & Urol.* 1931. May. Vol. 31. No. 5. pp. 671–696 (79–104). With 7 text figs. [6 refs.] [In Japanese. German summary pp. 45–47. 1 ref.] [Dermato-Urol. Clinic, Med. Acad., Kumamoto.]

LEFÈVRE. Urticaire géante au cours d'une dracunculose.—*Ann. de Méd. et de Pharm. Colon.* 1931. Apr.–May–June. Vol. 29. No. 2. pp. 329–332. [1 ref.]

MATONO (A.). Ueber die *Strongyloides stercoralis* bei Enteritis polyposa.—*Fukuoka–Ikwadaigaku–Zasshi.* 1931. Sept. Vol. 24. No. 9. [In Japanese. German summary p. 94.] [Path.-Anat. Inst., Kyushu Imperial Univ., Fukuoka, Japan.]

MEXICO, INSTITUTO DE BIOLOGIA DE LA UNIVERSIDAD NACIONAL. Bibliografias : 1. Bibliografia relativa a la onchocercosis en Mexico y Guatemala (1919–1930) [CABALLERO y C. (Eduardo)].—5 pp. 1931. Chapultepec : Inst. de Biologia.

MORGAN (D. O.). On the Occurrence of *Hepaticola hepatica* as a Natural Infection of the Wild Rabbit in England.—*Jl. Helminthology.* 1931. Feb. Vol. 9. No. 1. pp. 39–40. [7 refs.]

NAUDI (J.). Bilharzial Scrotal Calculi.—*West African Med. Jl.* Lagos. 1931. Vol. 5. No. 1. p. 12.

VANNI (Vittorio). Parassiti animali e appendicite.—*Riforma Med.* 1931. Sept. 21. Vol. 47. No. 38. pp. 1442, 1445–1447. With 2 text figs. [1 ref.] [Parasit. Inst., Univ., Rome.]

YOSHIDA (Tomokazu). Experimentelle Untersuchungen ueber die Bedingungen für die Einwanderung von *Clonorchis sinensis* in den *Ductus pancreaticus*.—*Okayama Igakkai Zasshi* (*Zent. d. Okayama Med. Gesellsch.*). 1931. Apr. Vol. 43. No. 4. pp. 920–934. With 1 text fig. [In Japanese. German summary pp. 935–936.] [Path. Inst., Med. Univ., Okayama.]

YOSHIMOTO (Seiichi). Ueber die quantitative Veränderung verschiedener Substanzen in der Leber bei Kaninchenclonorchiasis.—*Okayama-Igakkai-Zasshi* (*Zent. d. Okayama Med. Gesellsch.*). 1931. May. Vol. 43. No. 5. pp. 1103–1110. [27 refs.] [In Japanese. German summary p. 1111.] [Forensic Inst., Med. Univ., Okayama.]

ZANALDA (Davide). Ascaridi lombricoidi eliminati per le vie urinarie maschili. Contributo clinico.—*Policlinico.* Sez. Prat. 1931. Aug. 3. Vol. 38. No. 31. pp. 1112–1113. [2 refs.]

REVIEWS AND NOTICES.

NEWMAN (Charles) [M.D. (Cantab.), M.R.C.P. (Lond.), etc.]. **Medical Emergencies.**—pp. ix+128. Churchill's Empire Series. 1931. London: J. & A. Churchill, 40, Gloucester Place, Portman Square. [8s. 6d.]

This must have proved a difficult book to write and on that account alone has a claim to an indulgent rather than a critical review. In the first place it can have been far from easy to decide what is meant by a medical emergency. The author in his preface defines the scope of his work as embracing those conditions in which accurate diagnosis and prompt correct treatment are necessary, but excluding operative or manipulative treatment. Nevertheless, he has found it impossible to exclude tracheotomy and blood transfusion which are certainly operative and others such as washing out the stomach in cases of poisoning and restoration of the apparently drowned which are undoubtedly manipulative. The mistake lies, as it so often does, in attempting to define. The author deals with the emergency stages only; subsequent treatment is not within the scope of the book. In other words it is a first-aid book for the medical man. There are separate chapters devoted to poisons, to conditions associated with coma and sudden paralysis, to convulsions, circulatory failure, haemorrhage, asphyxia, the colics, sudden insanity, and a few miscellaneous emergencies which would not fittingly come under the preceding. The book is largely of the nature of a handy reference, or reminder, for, with few exceptions, it contains little with which the modern qualified man is not well acquainted. It is good to see that Brudzinski's sign is considered of greater value than Kernig's in diagnosis of cerebrospinal fever, but it is not a fact that the onset of this disease is always slow, nor will all agree that cerebral haemorrhage is usually fatal. The chapter of advice regarding Sudden Insanity (Chapter VIII) is exceptionally valuable. For tropical practitioners the book will be found wanting; heat stroke and sunstroke together occupy but half a page, and no distinction is drawn between heat exhaustion and heat hyperpyrexia; malaria is not even mentioned as a cause of coma, and the anaemia of hookworm (which is mentioned) is not a "medical emergency." Misprints are too many for so small a book, but some errors cannot be put to the score of the printer. T.B. means tubercle bacillus not tuberculosis (p. 69), mucous is not a noun (pp. 73, 74) and "lie" is used almost always (6 times at least) as a transitive verb so that we are given the following instructions, difficult indeed to follow, for resuscitating the apparently drowned: "Hold the body upside down . . . Then undo clothing and lie face downwards, with the head turned to one side and start artificial respiration" (p. 83). A revised edition which will almost certainly be called for will doubtless prove more useful than th first.

H. H. S.

TUNISIE MÉDICALE. 1931. May. Vol. 25. No. 5. pp. 161–327. With numerous illustrations.

Tunis is this year celebrating the 50th year since it came under French protection. The editors therefore of *La Tunisie Medicale*, which is the organ of the Société des Sciences Médicales de Tunis, publish a special number showing the progress achieved in all branches of medicine since 1881. The number contains 22 articles, most of them by doctors. They deal with conditions prior to the protectorate, progress in social hygiene, the hospitals, the Institut Pasteur and other topics too numerous to mention.

A. G. B.